Promoting private pensions in China: a tax policy based on the experience of the OECD countries

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PROMOTING PRIVATE PENSIONS IN CHINA:

A Tax Policy based on the Experience of the OECD Countries

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ABSTRACT

The current state old-age pension system in China has two severe problems: the urgent and immediate problem of the pension burden of State-Owned Enterprises and the longer-term problem arising from the rapid ageing of the population.

The current state pension system which operates on a pay-as-you-go basis combined with individuals' saving accounts is incapable of tackling either of these problems. It does not provide a level playing field for different enterprises, hinders restructuring of State-Owned Enterprises by delinking pension provision from enterprises management, nor assist in the term transformation of savings and the funding of infrastructure and other long-term investment. This thesis argues that one approach to solving this problem lies in reducing contribution rates and expanding coverage by encouraging a privately managed and funded pension system with contributions that are closely linked to future benefits.

This thesis examines the way in which this problem can be solved by the promotion of private pensions. By looking in detail at the way OECD countries treat five of the main assets held by households: bank deposits, government bonds, share ownership, home ownership and private pensions, this thesis concludes that tax privileges are one of the important factors underlying the rapid growth in private pension schemes in some industrial countries. As argued by the OECD (1994: 3): "...although there is no clear evidence that taxation affects the overall level of saving by households, it certainly affects the allocation of such saving between different assets...". Removing those tax incentives may lead to higher effective tax rates on pension savings and hence diminish the popularity of private pension schemes, as did in fact happen in New Zealand.

Based on the tax treatments of private pensions in OECD countries, I have analysed five common tax models, i.e., EET (contributions exempted, fund income exempted, benefits taxed), TEE (contributions taxed, fund income exempted, benefits exempted), ETT (contributions exempted, fund income taxed, benefits taxed), TTE (contributions taxed, fund income taxed, benefits exempted) and Eet (same as EET but tax-free lump sum payment) as alternative options for China. The five models are mainly compared on the grounds of economic efficiency and analysed from the point of view of individual

savers. Which of the five tax regimes is the best option? This analysis suggests that the most attractive tax regime for individual savers is also the most expensive one for the government in terms of the forgone revenues. This thesis also compares the relative cost to the government of the tax incentives by estimating the tax revenues of the five alternative regimes. The cost is measured as deviations from the current tax treatment on bank savings in China.

This thesis also examines the features of private pension schemes and the distributional effect of fiscal benefits from the aspect of fairness and equality. Unlike the case of direct expenditure by the government on state old age pensions for all employees, which benefits mainly middle to low income employees, the cost of the tax expenditure on private pension schemes benefits mainly higher income employees.

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I. INTRODUCTION AND THESIS PLANS

1.1 Research Background

Proposals for radical pension reform are increasingly reaching the top of the government agenda from developed to developing countries. The need for worldwide pension reform is driven by high public expenditure combined with demographic changes and stagnation in economic growth. In OECD countries total social expenditures on income support for the elderly have increased since 1960. For the OECD area as a whole, public pension expenditures as a percentage of Gross Domestic Product (GDP) rose from 4.4 percent in 1960 to 9.2 percent in 1985 (OECD, 1988: 30). The *Eurostat-ESSPROS* data for the EU-15[1] reports that expenditures on pensions (including cash benefits in the disability pensions, old age pensions, survivors' pensions and unemployment benefits) accounted for 13 percent of GDP in 1997. In most of member states in the EU-15, expenditure on pensions took the largest share of expenditure on social protection, namely 48 percent of total expenditure. In China public pension expenditures rose dramatically during the last 10 years of the last Century. From 1991 to 2000, the annual average increase in pension expenditures reached 30.19 percent. However, the annual average increase in pension contributions was only 27.92 percent during the same period.

The current public pensions in China are basically operated on a pay-as-you-go basis, i.e. the revenues collected from general taxation or contributions from the working generation are immediately used to finance the benefits of the currently retired generation. Consequently, changes in the numbers of retirees relative to the numbers of employed have an immediate effect on the financial situation of the scheme. A very direct way in which the ratio of retirees to employed is altered arises from changes in the demographic structure and the ageing of the population. Already since the turn of the 1980s China has experienced a substantial increase in the proportion of elderly people in the population, with a considerable impact on the share of public pension expenditure

[1] Including Belgium, Denmark, Germany, Greece, Spain, France, Ireland, Italy, Luxembourg, Netherlands, Austria, Portugal, Finland, Switzerland, and United Kingdom.

from total national resources. The ratio of workers to retirees decreased from 30.3:1 in 1978 to 3.3:1 in 2000. This means that in 1978 one retiree was supported by 30 workers, while in 2000 one retiree was supported by only three workers. However, this development will become even more important in the future as the ageing trend is accentuated. Due to rapid increases in life expectancy and declines in fertility rates, the population is ageing much faster than it did in industrial countries. While those over 60 accounted for 9 percent of China's population in 1990, they will be 22 percent of the population in 2030 and 26 percent in 2050. It will take China only 30 years to reach the 1990 OECD level of 18 percent, while in most OECD countries it took nearly a century for the population over 60 to double from 9 percent to 18 percent.

Adding to the long term problems of population ageing, longer life expectancy due to developments in medical technology and declining capacity of family support for the elderly is the urgent problem of enterprise restructuring due to the high pension burden resulting from high rates of contributions to the pension pool under the public pension scheme. Under the current pension system, a retiree, depending on his/her former employment, can obtain 60 to 90 percent of his or her standard wage, and in some areas, the replacement rate can reach as high as 100 percent. The retirement benefits of state pensions are even higher than those in so-called high welfare nations such as the Scandinavian countries. In the past, the generous social security pension was proclaimed as one of the advantages of the socialist economy, but today it is held responsible for depressing economic growth and slowing down enterprise restructuring. As China is attempting to move towards a market-oriented economy, the issue of how pension policy affects the efficiency and productivity of the enterprises becomes significant. Under these circumstances there is a great urgency to undertake the reform of the retirement system.

The World Bank (1994) has proposed a far-reaching reform to the pension systems in both developing and developed economies. The Bank argues that the current pay-as-you-go defined benefit pension systems, which exist in many rich as well as poor countries, are seriously flawed and no longer serve the objectives they were intended to promote. The Bank proposes instead fully funded, mandatory, defined contribution, private pensions as the main pillar of its new system. It suggests that the proposed

reform will not only be beneficial to retirees and pensioners but also at the same time enhance savings and promote capital formation and economic development. Economists have a wide array of views about the extent to which pension provisions should move from a pay-as-you-go based publicly managed and defined benefit system to a funded and privately managed and defined contribution system.

Since the end of the 1970s there has been a marked change in the final GDP distribution within sectors in China. There has been a dramatic decline in the proportion of the government sector in the national income as a whole, a slight increase in the collective sector (mainly in Collective-Owned Enterprises), and by contrast, a rapid rise in the individual sector. Therefore the capacities of the government, the enterprises and individuals to bear the pension responsibilities have also changed. For instance, the percentage of the state revenue to GDP dropped from 28.4 in 1979 to 12.4 in 1998. Also, the ratio of total tax revenue to GDP dropped from 13.32 in 1979 to 11.67 in 1998. State ability for social income redistribution is therefore weakening. State-owned Enterprises across the nation as a whole ran at deficit in 1996, which made it a hard task for them to maintain the heavy burden of the pension costs. On the other hand, during the period from 1978 to 1998, individual income per capita in nominal terms for the urban residents increased at an annual rate of 16.85 percent, and their fixed bank deposits rose at an annual rate of 31.61 percent from 12.89bn Yuan to 4,179.16bn Yuan. Under this predicament private pensions, as a supplement to the current state pension system, could be considered an efficient way of reducing the pension burden as has appeared in the welfare literature as well as in western practices since the 1980s (Le Grand, J. and Robinson, R., 1984; Papadakis, E. and Taylor-Gooby, P., 1987).

In 1995, with the reform process of the public pension system, the government of China called for the establishment of an enterprise supplementary pension [2] as a supplement to the state pension in recognition that pension expenditure has become a heavy burden for both central and local governments. Although the government has been encouraging the development of private pensions including the enterprise supplementary scheme and personal saving scheme, there has not been much response from either enterprises or

individuals. The pension mixture in China has been dominated by the public pillar, i.e. the state pension. Appendix 1-1 shows that the rate of coverage of private pensions, including enterprises supplementary pension schemes and some personal savings, was about 2 percent by the end of 1996. Due to the availability of the data, this calculation does not include those private pension schemes operating on industrial levels. However, the coverage is even lower if estimated on a national basis. According to interviews with pension researchers, by the end of 1994 less than 1 percent of enterprises were providing supplementary pensions and less than 1 percent of workers participating in personal saving pension schemes. The traditional Chinese welfare model centred on the family and work unit. For those living in the rural areas that constitute almost 80 percent of the national population, formal pension coverage is still rare and the families are their only source of income assistance at retirement.

Five major factors could contribute to the minimal importance of the private pensions in China. First, the replacement rate of public old-age pension is high enough to maintain the life standard of covered workers in retirement life, therefore the scope and role of supplementary pensions are limited. Second, the financial market is underdeveloped and lacks investment instruments for the private sector. Third, saving through banks is the tradition for most Chinese people, although they might invest a small portion of their incomes in government bonds and other securities. Fourth, the long-term social welfare policy could have helped to produce a dependency culture: it is generally believed that social security is an inherent benefit of the socialist state and should, therefore be provided by the government. Finally, the government has provided enterprises limited tax incentives to set up pension insurance for employees and has provided individuals zero tax incentives to save for themselves.

Unlike that in China, private pensions in developed countries have been growing sharply since the Second World War, especially in recent decades and are playing an increasingly important role in providing retirement income for the elderly population.

[2] There are no typical personal pension schemes in China. Those people who are aware of poverty in old age do save for their retirement purposes, but those saving mainly unitise the form of life insurance, which are currently operated by either social insurance executive agencies or commercial insurance institutions.

This phenomenon can be recognised in the light of private pension assets as a percentage of GDP rising over time. The holdings of financial assets by pension funds have increased as share of GDP by about 11 percentage points over the last ten years of the twentieth Century for the OECD area as a whole, the stock rising from 28 percent of GDP in 1987 to nearly 39 percent of GDP on average in 1996. In some countries such as the United States, United Kingdom, Netherlands and Switzerland, the pension fund assets exceeded 50 percent of GDP. Even though private pension schemes have only been introduced in recent years in some countries, they are growing at a rapid pace.

This thesis discusses why and how part of the public pensions in China could and should be transferred to the private sector by setting up a private pension system. In view of the fact that in many countries the investment income of private pension funds is exempt from taxation but the majority of other savings is not, this thesis focuses on the issue of taxation. It analyses the paramount importance of tax incentives to developments of private pensions in some OECD countries and discusses how Chinese private pensions should be taxed. In the conclusion chapter, the issue of general tax reform - improving tax administration on personal income - is addressed because tax incentives only work with a well functioning income tax system.

The development of private pensions in OECD countries can also be attributed to the following important reasons, which may not appear together in a particular country. First, in some countries public pension programmes are intended to provide people with basic benefits so that private pensions have to play a large role in providing retirement income for retirees. Second, well-developed financial markets create the fundamental conditions for funded pensions to gain high returns. Third, in some countries setting up a pension scheme for employees is compulsory for employers and in others individuals are mandated to contract with a personal pension scheme or life insurance company. Therefore, the importance of mandation and regulations to the promotion of private pensions in China is also discussed where relevant.

As there is no clear line drawn between public and private pensions it is necessary to define here what is considered as a private pension in this thesis. In theory, a retirement pension system could be any combination of the following three pairs of elements:

public system and private system, defined benefit and defined contribution, pay-as-you-go and funded. A *public* system is organised and administered primarily by the government, whilst a *private* system is one that is organised and administered primarily by the private sector. A *defined benefit* plan pays a worker's pension that is conditional on a worker's earnings history, length of employment and year of retirement. A *defined contribution* plan, on the other hand, does not have pre-determined benefits: a worker's future pension depends basically on the asset performance that is determined by managers and financial markets. A *pay-as-you-go* programme means that there are no accumulated funds against pension liabilities: current workers' contributions pay current pensioners while their future benefits are paid by the future workers in the form of either tax or contribution. In a *funded* programme, however, pension liabilities are pre-funded against future payments to pensioners: individuals' pension benefits depend on their previous contributions and accumulated assets. Any combination of these elements is possible although in practice some are more common than others. A private pension in this thesis refers to a pre-funded pension system on the basis of either defined benefit or defined contribution and run either by the government or outside the government. It includes both enterprise pensions (occupational pension) and individual savings pensions (personal pension) and also voluntary schemes and compulsory schemes.

1.2 Research Methodology

This thesis combines an institutional analysis and the analytical technique of modern economics of public finance. Secondary data provide the main sources for the study. As Yin (1994: 4) classifies, there are five major research strategies in social science: experiments, surveys, histories, secondary data analysis and case studies. This thesis utilises secondary data analysis by way of tax rates and regulations obtainable from the countries studied. The benefits of the secondary analysis, as Dale *et al.* (1988: 44-45) argues, are of particular value to the lone researcher who wishes to use quantitative methods but has no source of funding, or to the research student who does not have the resources to carry out the primary data collection necessary to answer a particular research problem. That is to say the advantages of secondary analysis are savings in terms of money and time, and the avoidance of data - collection difficulties. The

secondary data used in this thesis include relevant statistics on public and private pension schemes in both China and OECD countries and more importantly, the tax treatment of five of the main household savings in China and OECD countries. Those data are obtained from the following four main sources: (i) The various versions of statistics yearbooks issued by the State Bureau of Statistics (China) and the Centre for statistics of the Ministry of Labour and Social Security (China); (ii) Surveys on the taxation of household savings by OECD in 1994 and OECD Tax Data Base 2000; (iii) Various publications and (iv) Series of Chinese documents issued by the State Council, the Ministry of Finance, the Ministry of Labour and Social Security and the State Administration of Taxation.

Some interviews were conducted with official representatives in China to give the analysis a stronger empirical grounding and to provide insight into contrasting views on China's current pension system, especially with regard to forms of state intervention in old age pension provision. These interviews took the form of consultative meetings with individuals involved in pension policy, or conduct research on pensions. They provide a considerable amount of important information as well as personal views on the reform of the pension system in China.

1.3 Plan of the Thesis

The first task of this thesis is to examine the problems of the current state old-age pension system in China that set the background for the research question. Considering the introduction of the Chinese state pension system, Chapter 2, examines the key characteristics of state pensions and addresses the needs for change.

The second task is to conduct a review of the literature on the issues of pension mix regarding some social but mainly economic objectives. This is intended to be a background to the tax analysis of fiscal incentives, tax incentive costs and policy choice conducted in later chapters. In Chapter 3 the relative merits and demerits of both public and private pension systems are discussed with special reference to the issues of benefit adequacy, risks, contributions returns, coverage and incentive to save. Some important

macro-economic issues relating to pensions will be discussed, notably, the link between saving and economic growth and the interaction with financial markets.

The third task is to examine the way OECD countries promote private pensions with their tax systems. Chapter 4 consists of a detailed study of the taxation of private pensions in the majority of OECD countries and summarises the differences and similarities. This chapter attempts to examine the effect of preferential tax treatments on the development of private pension and the sensitivity of saving flows to tax incentives, based on the experience of some OECD countries. Five tax models were chosen in order to observe an ideal tax model for the purpose of promoting private pensions in China. The five tax models, based on OECD regimes, are EET (contributions exempted, fund income exempted, benefits taxed), TEE (contributions taxed, fund income exempted, benefits exempted), ETT (contributions exempted, fund income taxed, benefits taxed), TTE (contributions taxed, fund income taxed, benefits exempted) and EEt (as EET but with a tax-free lump sum payment). The chapter compares the five models, which differ in both efficiency and equity, from the viewpoint of encouraging saving for retirement in particular.

The fourth task in Chapter 5 is to compare the *Degree of Fiscal Privileges* of five financial assets (bank deposits, government bonds, private pensions, shares and houses) in China and five OECD countries. The five OECD countries selected for the comparison are France, Germany, Sweden, New Zealand and the United Kingdom. The objective is to examine, on one hand, to what extent private pension funds in OECD countries are more lightly taxed than other forms of saving and on the other, to what extent current private pensions in China are tax discriminated.

The fifth task is to compare the five tax models, EET, TEE, ETT, TTE and EEt, from the cost perspective. Chapter 6 estimates the size of the tax cost under each of the five different tax models in order to provide Chinese policy makers with a general picture of future tax expenditures resulting from tax deduction or exemption on pension fund investments, contributions or benefits.

The final task, in Chapter 7, is to summarise the main analyses and findings in the previous chapters and draw some conclusions for future policy. In this chapter, an attempt is made to propose an appropriate tax model for private pensions in China. A recommendation is made of one of the five tax models previously examined, based on a comparative analysis from the perspectives of both individual savers and government. In order to implement an effective tax policy for promoting private pensions without causing enormous fiscal deficits, the final chapter will also provide some alternatives for dealing with the tax cost.

II. STATE PENSION IN CHINA: HISTORY AND CHALLENGE[3]

2.1 Introduction

Since the establishment of the People's Republic of China by the Communist Party in 1949, the government has introduced a comprehensive social welfare system to both urban and rural populations. An important role is played by social assistance benefits, such as the Urban Minimum Income security system, and the so-called "Rural Five-Guarantees" scheme which guarantees the childless elderly the provision of food, housing, clothing, medical care, and burial expenses. For the mainstream of the urban working population, the social security system provides the main source of assistance for maternity, medical service, work injury and old-age pensions. This chapter focuses only on the old-age pension scheme.

The structure of the rest of this chapter is as follows. Section 2.2 briefly presents the historical development of the state pension provisions in China as an introduction to the discussions on the current pension system in later sections. Section 2.3 simply illustrates the current pension system, focusing on its coverage, contribution requirements and benefit entitlements. Section 2.4 addresses the key problems of the current pension system, especially its drawbacks of low coverage and high enterprise contributions. Section 2.5 highlights the implication of a high pension burden on enterprises, the State-Owned Enterprises (SOEs) in particular, and pressures stemming from an ageing population and demographic change. The final section draws conclusions on this chapter.

2.2 Historical Review of the State Pension

There were no formal arrangements for retirement in China until after 1 October 1949 when the People's Republic was established. This section describes the evolution of the state pension system from the first regulation in 1951, giving emphasis to the series of adjustments and fundamental amendments since the 1980's, especially in 1995 and

[3] This chapter is largely based on the World Bank (1996) and Gong, S. (1999).

1997. By doing so this chapter will help to provide an understanding of the changes to state pensions in China and put the later discussion into perspective.

2.2.1 The Creation of the Labour Insurance in the 1950s

The first regulation about labour insurance was issued by the State Council in 1951. It introduced an old age allowance, disability and survivor benefits as well as other insurance benefits for some management and workers (Song, Zhang and Zhen, 1998: 42). The 1951 regulation only covered a few service sectors and industrial enterprises with more than 100 management and workers. The pension benefits were about 35 to 60 percent of individual workers' wages, depending on the length of service in the enterprises from which the worker retired.[4] This level increased from 50 to 70 percent in 1953, the first year of the first Five-Year Plan.[5] The pension benefits and other insurance benefits were financed by enterprise contributions at a rate of 3 percent of wage bill. Because of the small number of retirees in relation to workers, the contributions were, of course, sufficient to finance the system on a pay-as-you-go basis. For example, in 1952, one year after the start of the program, there were only 8 million enterprise workers and 20,000 retirees, or over 400 workers per retiree. In 1958 the coverage was extended to enterprises with less than 100 management and workers and also government employees. However, few COEs joined the system because of a limited number of workers and small-scale of production.

The social insurance system was supervised by the Ministry of Labour and jointly administered by the Ministry of Labour and the All-China Federation of Trade Unions (ACFTU). In 1954 the administration was unified and totally transferred to the latter. It was required that 70 percent of the contributions were retained by the trade unions of individual enterprises while the remaining 30 percent were transferred to a national master fund and managed by the ACFTU. Pensions and other social insurance benefits

[4] It is noticeable that in the 1951 regulation there was different treatment for management and workers: the benefit rates for the former was higher than that for the latter.

[5] The first Five-Year Plan was 1953-1957; the second Five-Year Plan 1958-1962; the third Five-Year Plan 1966-1970; the fourth Five-Year Plan 1971-1975; the fifth Five-Year Plan 1976-1980; the sixth Five-Year Plan 1981-1985; the seventh Five-Year Plan 1986-1990; the eighth Five-Year Plan 1991-1995; the ninth Five-Year Plan 1996-2000.

were firstly paid from the enterprise funds while the fund managed by ACFTU was used as a last resort. Under this arrangement, the fund could be balanced at the national level.

2.2.2 The Pension Provisions during the "Cultural Revolution"

The state pension system created in the 1950s continued its operation until the beginning of the "Cultural Revolution" that lasted for ten years from 1966. During the period of "Cultural Revolution", the social insurance system, including pension insurance, was suspended.

At the beginning of the Revolution, the activities of trade unions and the Ministry of Labour at all levels were interrupted. In 1967, ACFTU passed the administration of the master fund to the Ministry of Finance. However, the fund became smaller and smaller due to decreasing contributions to the labour insurance funds and the misuse of those funds accumulated. In 1969 the Ministry of Finance had to transfer responsibility for pension provision to individual employers ("working units" in Chinese term). From then each employer paid pensions to its own management and workers. The social insurance system was, in fact, revised to an enterprise-insurance system.

Due to an absence of records, some employees did not receive their full entitlement whilst others received more than they should have. Many retirees in about ten provinces did not receive benefits regularly. In many factories and enterprises workers kept on working unless they were physically incapacitated. According to the statistics in 1978 there were 2,000,000 management and workers in enterprises and 600,000 in institutions and organisations who should have been retired.

2.2.3 The Pension Revisions after the "Cultural Revolution"

In 1978, the State Council issued new pension regulations [6] for SOEs, government institutions, and non-profit organisations. It was reaffirmed that the retirement ages were 60 for men (65 at executive levels) and 55 for women (50 for blue-collar workers) with

[6] Document 104 of 1978.

additional adjustments for those in arduous and unhealthy jobs (in which cases, 55 for men and 45 for women). Under the new regulation the pension benefits, about 60-75 percent of the last month's standard wage, depending on length of services, were payable after 10 years instead of 25 years under the old regulation. Those who had worked for at least 20 consecutive years would receive pension of 75 percent of their standard wage. Those who had worked for 15 to 20 years would receive 70 percent. Those who had worked for 10 to 15 years could expect 60 percent.[7] There was a minimum guaranteed pension of 30 Yuan per month. Disability pensions were related to the final standard wage and the extent of care needed.

The government encouraged the COEs to provide pension benefits to their management and workers. Between 1977 and 1979 several documents were issued to recommend that the co-operative factories in light industry, transport, co-operative shops and collective-owned clinics follow the same rules as the SOEs in implementing the 1978 regulations on pension benefits. Those not covered could set aside a part of their pre-tax profits for social insurance benefits, including pensions, with approval from labour authorities and local taxation departments.

The merit of the 1978 reform lies in its reestablishment of a retirement system. However, the pension system had two core unsolved problems. The first was that of high pension costs. As mentioned earlier, due to the interruption of the retirement system during the "Cultural Revolution", a large number of workers who had already passed their retirement age kept on working. This resulted in huge pension costs with the reinstatement of retirement at the end of the Revolution. Moreover, the cost increased as the 1978 regulation provided incentives for early retirement. The minimum number of years' service required to qualify for a retirement pensions was revised from 20 to 10 in order to create more job vacancies for the returning youths who had been sent to the countryside to receive "Re-Education from Farmers". In addition, the cost increased even faster with a new regulation stating that the pension benefits were based on a worker' last month's standard wage. Thus, the 1978 regulation provided incentives

[7] There were two different treatments in the 1978 regulations between those who were employed before 1st October 1949 and those who were employed after because those senior officials who had made great contributions to the revolution and construction thus being different treatment. Those employed before 1st October 1949 could get pensions of 80 percent of their last month's standard wages.

for enterprises to increase their workers' final wages in the year before retirement. Given those incentives, between 1978 and 1985 the total number of retirees jumped fivefold and the pension costs rose from 2.8 percent of the urban wage bill to 10.6 percent. It must be noted that enterprises also provided other in-kind welfare besides insurance benefits. Most enterprises provided welfare such as health care, housing, clothing, food, entertainment facilities, haircuts, showers and even kindergartens and schools. It was noted that enterprises were like mini-welfare states providing all the needs of their employees from "from cradle to grave". The second problem was the uneven distribution of the pension costs between enterprises: costs were much higher for those with a higher ratio of retired to employed. Under the system in which each enterprise had to pay its own retirees' pensions (since the "Cultural Revolution"), the question of how those enterprises financed their pension costs became crucial.

2.2.4 Recent Reforms since the Middle of the 1980s

Before the economic reform and the open door policy that started at the end of the 1970s, enterprises were not concerned about the effect of their payments because their budgets were not completely separated from the government budget. With the deepening of enterprise and economic reforms, a frame of social security system in line with a market-oriented economy was strongly required. The government had to put further reforms on social securities at the top of its priorities. Since the middle of the 1980s, some fundamental changes have taken place in the pension system in China.

(a) Social arrangements or social pooling (1986)

In order to redistribute uneven pension costs across individual enterprises, the government had to encourage the pooling of pension liabilities. In 1986 the State Council (State Council, Document 77 of 1986) established a pooling system across SOEs, predominantly at the municipal level and, less importantly, in certain industrial sectors such as the non-ferrous industry and the coal industry. The pool operated by setting a contribution rate for participating enterprises. If the pension costs of an enterprise were less than the contribution rate, it would remit the difference to the pool,

if pension costs were higher than the contribution rate, the pool would cover the difference for the enterprise.

The 1986 pension reform was accompanied by employment reforms that established contract labour. New workers were to be hired on a contractual basis while the current workers would continue as permanent workers. Separate city pension pools were established for contract/new workers and permanent/current workers. The contract workers made individual contributions while the permanent workers did not. Enterprises contributed to both pools. In the late 1980s the pooling plan was extended to COEs' workers (separated from SOEs' workers) in many cities.

It must be added that although enterprises retained the responsibility for distributing the pensions, the pooling system did help to redistribute the pension costs across enterprises, reducing the heavy pension burden of some enterprises. However, the pooling was operated on a very small scale and the rates of contributions still varied enormously across individual enterprises.

(b) Individual contributions (1991)

In 1991 the State Council[8] called for individual contributions from all workers. All workers would be required to contribute 3 percent of their standard wages to the pooling funds in addition to enterprise contributions. It was also stipulated that the pooling system or the social arrangement should be partially funded. The funds in the pool were to be managed by the social insurance executive agencies, which were supervised by the Ministry of Labour. Funds had to be put in banks in a special pension insurance account and used only for paying pensions.

(c) Combinations of Social Pooling and Individual Accounts (1995)

Document 6 issued by the State Council in 1995 was a major guide for recent pension reform. It set up the following principles. First, the benefit level should be adapted to the social productivity of the country and should be sustainable. It addressed need for China

[8] The State Council Document 33 of 1991.

to draw lessons from European countries where pension expenditures had already been the heavy burden on the governments' budgets. The replacement rate of state pension would be lowered gradually as the average wage level increased. Second, the pension system must combine individual rights and responsibilities. In other words, social mutual aid must be combined with self-insurance. This meant that the pension benefit would be based on the individual compulsory contributions during employment. Third, the pension costs would be shared between individual participants, enterprises and the government. It was required that China set up a three-tier pension system including a state pension, an enterprise supplementary pension and individual savings pension. Fourth, equity would be combined with efficiency. At the primary stage of social market economy in China the efficiency principle would be placed in a position of higher importance in order to enthusiasm for work. Fifth, administrative services would be separated from fund management. According the State Council, the administrative services, including collection of funds and benefit payments, should be transferred from enterprises to the executive agency at all governmental levels. Post offices and banks would assist with payment procedures and tax authorities with collection.

The State Council recommended two plans for the reform. The objective of the both plans was to combine the social pooling (state pension provision) and individual accounts.[9] They combined in different ways with Plan 1 having emphasis on the personal saving account and plan 2 having emphasis on the primary social insurance account.

Under Plan 1, the state pension for new workers employed after the reform was completely based on individual accounts. A social pool was responsible for pensions for those already retired, for current workers not covered by individual accounts and for certain adjustments for the retirees drawing from individual accounts. Each local government set the rate of enterprise contributions to the social pool according to the number of retirees in their localities. Contributions credited into individual accounts

[9] This idea was piloted in Fujian province in July 1989. Subsequently, from 1991 to 1992, two different approaches experimented respectively in Shenzhen and Hainan were approved by the State Council. In 1993, Shanghai proposed a plan, which was accepted by the State Council as one of the two recommendations to the national wide in March 1995.

were approximately 16-17 percent of the total wages and contained the following three parts:

- an individual contribution of 3 percent of the individual worker's total wages;
- an enterprise contribution of 8 percent of each worker's total wages and
- an enterprise contribution of 5 percent of the average local wages.

Individual contributions were to be increased over time whilst enterprise contributions would decrease by 1 percentage point every 2 years for 10 years until individual contributions accounted for half of the total contributions to the individual account, about 8 percent of total wages.

A worker who having contributed to the new system for at least 15 years or having had a continuous employment tenure (including the contribution years) of at least 10 years before the reform would receive a monthly pension after retirement equal to 1/120 of total accumulated contributions to the individual accounts. Should the pension be less than the minimum pension, the government would make up the difference. The level of minimum pension was specified by local governments. It is estimated that a worker who contributes for 15 years will receive an average pension of 24 percent of the wages in his or her final working year. For those who contribute for 20, 25, 30, 35 and 40 years the replacement rate would be 32, 40, 48, 56 and 64 percent respectively.[10] A worker with less than 15 years of contributions would receive the accumulations on his or her individual account in a lump sum on retirement. A worker who outlives the individual account would continue to receive a pension from the social insurance pool.

Plan 2, on the other hand, emphasised social pooling over individual accounts. The total cost of the state pension, including the social pool and individual accounts, was financed

[10] Author's calculation based on the following replacement rate formula:
Replacement rate = $(0.005\,\overline{W}_{t-1} + 0.011\,W_{t-1})/n\,W_{t-1}$ (The Ministry of Labour, 1995: 139-144).
Where: n is the number of years of contributions;
$\overline{W}_{t-1}$ the social average wage in the year before the retirement; and
W_{t-1} the individual's wage in the year before the retirement.

Note: it is also assumed that
a) Individual's wage base for the purpose of contribution is equivalent to the social average wage.
b) The growth rate of individual's wage is equal to the growth rate of the social average wage.

by individuals and their enterprises. Again local governments set up the rates of contributions for both individuals and enterprises. However, only 3 percent of individuals' total wages were credited to individual accounts. For those whose payment period was longer than 10 years, the pension would consist of the following parts:

- a social pension equivalent to 20-25 percent of the local average wage;
- an earnings-related pension equivalent to 1.0-1.4 percent of average wage for each year of contribution;
- an individual account pension equivalent to 1/120 of total accumulations on individual accounts to be drawn as a lump sum or annuities.

The Ministry of Labour (1995: 141) estimated that a worker who contributed for 15 years would receive an average pension of about 38.5 percent of the previous year's wage before his or her retirement. For contributions of 35 and 40 years, the average replacement rate would be 63.5 percent and 69.8 percent respectively[11]. A worker with less than 15 years of contributions would receive the amount in the individual account in one lump sum on retirement. As in Plan 1, there were special transitional arrangements for those who had already retired and for employees not fully covered by the new scheme.

By proposing two plans and allowing localities to choose between them or any combination of the parameters of the two, the 1995 reform opened up a *"Pandora's Box"*. With the right to select its own reform plan, each municipality attempted to differentiate its scheme from the others in order to retain control. Individual saving accounts and social pooling were combined in quite different ways, leading to the creation of different schemes all over the country. According to the Ministry of Labour statistics (1995), before July 1995 seven provinces, including Shanghai, preferred Plan 1; eight provinces, including Beijing, preferred Plan 2; eleven provinces chose a compromise between Plan 1 and Plan 2; the remaining 4 provinces remained undecided.

c) The imputed rate to individual accounts is equal to the growth rate of the social average wage.

[11] The calculation is based on the following replacement rate formula:

$$\text{Replacement rate} = \sum_{t=1}^{n} \frac{A_t}{10}$$

Where: n is number of years of contribution; A_t is the rate of contribution (determined by the local government) credited into individual accounts in year t.

(d) Unification of the state pension (1997)

After two years of experimentation with the combination of social pooling and individual accounts, the relevant ministries finally realised how serious was the fragmentation of the pension system. This impelled them to make compromises between the two reform plans proposed in 1995. The State Council enacted Document 26 in July of 1997. At the end of July, only 15 days after the issue of Document 26, the State Council held a national work conference on the unification of the state pension system. In this meeting the State Council urged local governments and relevant departments to act immediately according to the new document and requirements of the meeting. Local governments and relevant ministries were required to make their own transitional plans for the unification and choose a date before the end of 1998 for the implementation of the unified plan. Thus the two plans proposed in 1995 were unified. Section 2.3 describes the main features of the pension system after the unification.

2.3 Understanding the Current System

After 50 years of changes and reforms to the pension system, the current system in China is still dominated by the public pillar, a largely urban-based, contributory, partially funded and defined contribution system. The rest of this section describes the developments and main characteristics of the current urban state pension system.

2.3.1 Developments of the State Pension

As described in previous sections, the coverage of urban employees has increased since the early establishment of the pension system in the 1950s. The 1951 legislation covered all employees in large industrial enterprises. A separate system with slightly different provisions was established under the 1955 regulations on pension policy for organisations and institutions. Since the middle of the 1980s, there have been separate schemes for permanent state sector workers and for certain industrial sector employees, including coal miners and railway workers. Since the early 1990s, a scheme similar to that for State-Owned Enterprise has been extended to other ownership enterprises and

self-employed urbanities. In principle, employees of all types of urban enterprises and the urban self-employed are covered by the old-age pension system in China. According to the Ministry of labour and Social Security, the number of enterprise workers covered by the state pension increased from about 56 million in 1991 to about 104 million in 2000 (Table 2-1). By the end of 2000, more than 31 million retired workers had been receiving pension benefits under the system. During the ten years the accumulated funds increased six fold from 14.4 billion Yuan in 1991 to 94.7 billion Yuan in 2000, although the rate of growth shows a general decreasing trend in Table 2-2.

Table 2-1 Employees and Retirees Contributed to Pension Insurance (person)

Year	Number of employees	Number of retirees
1991	56,536,574	10,865,757
1992	77,746,588	16,814,953
1993	80,081,670	18,394,447
1994	84,941,412	20,794,000
1995	87,377,929	22,411,584
1996	87,584,105	23,583,113
1997	86,709,700	25,334,300
1998	84,758,275	27,273,130
1999	95,018,110	29,835,976
2000	104,474,965	31,699,347

Source: *China Labour Statistical Yearbook*, 2001.

Table 2-2 Revenues, Expenses and Reserves of Pension Insurance (million Yuan)

Year	Revenues	Growth (%)	Expenditures	Growth (%)	Balance	Growth (%)
1991	21,570.84	20.6	17,307.14	15.9	14,406.88	47.2
1992	36,576.60	69.6	32,191.45	86.0	22,060.83	53.1
1993	50,354.02	37.7	47,063.03	46.2	25,858.89	17.2
1994	70,742.45	40.5	66,109.02	40.5	30,476.62	17.9
1995	95,005.07	34.3	84,760.87	28.2	42,983.38	41.0
1996	117,176.39	23.3	103,186.89	21.7	57,856.04	34.6
1997	133,790.51	14.2	125,132.80	21.3	68,284.82	18.0
1998	145,897.37	9.0	151,162.67	20.8	58,783.32	-13.9
1999	196,511.51	34.7	192,485.43	27.3	73,354.16	24.8
2000	227,812.85	15.9	211,548.33	9.9	94,711.65	29.1
Average		27.92		30.19		22.19

Source: *China Labour Statistical Yearbook*, 2001.

2.3.2 The Mechanism of Social Pooling and Individual Account

As described in the previous section, individual workers did not start contributing to pension schemes until the middle of the 1980s. Since the 1986 reform, all workers covered by the state pension have to contribute a percentage of their earnings. Under the 1997 regulation, contribution from individual workers was set at 4 percent of his or her monthly wage. This rate would increase at one percentage point every two years, from 4 percent at the beginning of 1997 to 8 percent. The rate in 2001 was 6 percent.

11 percent of an individual's total wages, financed by the worker (4 percent) and his or her employer (7 percent) was credited to an individual account. As mentioned above, contributions from the employer decreased over time from 7 percent to 3 percent until the individual contributed 8 percent. Interest set by the government is credited to the individual account each year, based more or less on bank interest rates. This fund can be used for the purpose of pension payment and no other. If a participant dies and accumulated funds are left, the portion from individual's contributions can be granted to beneficiaries designated by the employee or legal heir. Should the pensioner outlive the accumulation of the individual account, the social pooling fund continues to pay pension until death. The accumulated fund in the account is also transferable when the participant changes jobs.

Enterprises are expected to contribute at least 13 percent and no more than 20 percent of total payroll to the social pool. The funds are used for the following purposes: pensions for those retired before the 1997 reform, a basic pension for new retirees, pensions for long-lived retirees and transition costs. The funds are also used for certain adjustments, mainly the automatic adjustments of all the benefits mentioned above.

An individual's contribution is based on the average monthly wage in the previous year. The monthly wage includes basic wage, bonus, allowance and subsidies. Both a floor and a ceiling are set for contributions. For the low-income worker whose monthly wage is lower than 60 percent of the local average, the latter would be used as the basis for contribution from both employee and employer, no matter how low the individual's actual wages. For the individual with a high income, monthly wages exceeding 200 or

300 percent of the local average would not be met by contribution demands. Anomalies and exceptions are reported to and jointly approved by the Ministries of Labour and Finance.

Until the middle of the 1990s there had been no contribution requirements for the government. The State Council Document 6 of 1995 stipulated that local governments were responsible for making up any deficits of the social pooling systems at their own localities, the Central Government for any deficits of the pooling systems in central industrial sectors. Since the beginning of 1998, with the condition that all accumulated funds be used to buy government bonds, government at all levels would have to defray the cost of administration needed for social insurance executive agencies.

2.3.3 Pension Benefits

To qualify for the old-age pension, two requirements must usually be met: first, the attainment of a specified age and second, the completion of a specified period of employment contributions. As mentioned earlier, since the 1978 regulation old-age benefits generally become payable at age 60 for men, 55 for women. Workers employed in underground mines, high temperatures, low temperatures, poisonous and harmful conditions or engaging in especially heavy physical labour may retire ahead normal retirement age. In addition, employees working in insolvent SOEs of the 111 chosen pilot cities under the process of capital restructuring and capital disposal are allowed to retire up to 5 years earlier than the normal retirement age with full pension. Disability benefits are available for those who are totally incapacitated for work and survivor benefits are payable for dependants of the deceased.

In general, the state pension would provide a basic pension equivalent to 20 percent of social average earnings plus that based on the earnings of the accumulations of the individual account. Participants were divided into three groups according to the date of employment or retirement, namely new employees, current employees and current pensioners. New employees are those employed after the introduction of the 1997 plan; current employees were employed before the reform and are yet to retire. Current pensioners are those who began their employment before the reform and have already

retired. According to Document 26 of 1997, there should be different formulae for the state pensions of the three groups. The new employee who contributes for at least 15 years and reaches retirement age will receive a monthly pension equal to 1/120 of the total accumulation of the individual account at retirement plus a basic pension equal to 20 percent of his or her own provincial average wage. Thus, a worker who contributes for 15 years receives an average pension of 36.5 percent of his or her final wage. Those who contribute for 20, 25, 30, 35 and 40 years, would receive 42, 47.5, 53, 58.5 and 64 percent of their final year's wage respectively.[12] Current employees who contribute for at least 10 years, including the time before the introduction of individual contributions, receive the pension accumulated in the individual account, the basic pension and a transitional pension paid by the pool fund. The transitional pension is the benefit paid for the years of service before the introduction of the individual account system. For new employees who contribute for less than 15 years and current workers for less than 10 years, no basic pension is paid while the individual account pension is granted in a lump sum. Current pensioners are paid benefits according to the original method before reform, based on the State Document 104 of 1978, the Ministry of Labour Document 275 of 1973, the State Document 6 of 1995 and the State Document 26 of 1997.

2.3.4 Pension Administration and Fund Management

Before 1998 there were three ministries independently supervising and administering pension schemes for different population groups in China. The Ministry of Labour was responsible for the urban pension insurance system of enterprise workers; the Ministry of Personnel was responsible for employees of organisations and institutes and the Ministry of Civil Affairs for farmers' pensions. In addition, 11 industrial ministries such as the Coal Industry were responsible for the administration or operation of pension schemes for their industrial sectors under the supervision of the Ministry of Labour.

[12] Author's calculation is based on the following replacement rate formula:

Replacement rate = $n\frac{11\%}{10} + 20\%$, where n is years of contribution.

Note: it is also assumed that

a) Individual's wage base for the purpose of contribution is equivalent to the social average wage.
b) The growth rate of individual's wage is equal to the growth rate of the social average wage.
c) The imputed rate to individual accounts is equal to the growth rate of the social average wage.

Under the 1998 institutional reforms all functions in the field of urban pensions were transferred to the Ministry of Labour and Social Security (MOLSS). While MOLSS is responsible for the general supervision, a separated agency, i.e. the MOLSS Social Insurance Administration Bureau, is an executive agency for contribution collection, benefit payment and organisation or even provision of personal social services. According to the principle that administrative service should be separated from fund management, the Ministry of Finance[13] required that all contributions must be deposited monthly in the accounts of the finance authorities at all levels. All expenditures are supervised and approved by both finance and social security authorities. In view of the fact that the financial market in China is far from developed, i.e. few financial instruments exist and no normative market regulations prevail, all accumulated funds except the reserve funds (equivalent to two months' benefits) are invested in government bonds, safe from the risks of the financial market.

2.4 The Problems of the Current System

After about 20 years of reform since the 1980s, a pension system fit for a market-oriented economy has taken shape in China. However, as reform, readjustment and restructuring are taking place in the politics as well as economy, the current pension system faces many problems that are examined next.

2.4.1 Limited Scale of Coverage

The state pension scheme covers only 20 percent of the working population, among whom 79 percent are urban employees. In rural areas most of the peasants and people in Township and Village Enterprises (TVEs) are not eligible for pensions. The family unit is still the core welfare institution for the old, especially amongst farmers. Although in 1991, a voluntary pension scheme was organised by the Ministry of Civil Affairs to cover farmers and workers in TVEs, the system in practice has not been effective. In 1995, after three years of operation, the average accumulation per participant across all 1,400 counties was 80 Yuan, about 2 percent of annual income of farmers (World Bank,

[13] The Ministry of Finance Document 6 of 1998.

1996: 6). The low coverage and fund accumulations were due to two reasons. First, the return from accumulated funds varied with investment performance and in some years was lower than the rate of price inflation. With such a low return, peasants and workers had no incentives to contribute to the scheme. Second, people in poor areas have difficulty joining the scheme because of their low income. Participation was highest in the richer areas such as Shandong and Jiangsu provinces.

Even in urban areas, most coverage is provided by the SOEs and COEs, mainly the SOEs. Although other ownerships such as Chinese-foreign joint ventures, joint stock companies, and foreign enterprises have to join the pooling plan regulated by the State Council (State Council, 1999)[14], participation is still far from complete. The Ministry of Labour and Social Security estimated that the state pension covered 96.66 percent of staff and workers in SOEs by the end of 1997, but just 79 percent of total urban staff and workers. The rates of coverage were even lower in COEs and other ownership enterprises, 53.7 percent and 31.8 percent respectively (see Table 2-3). It must be noted that Table 2-3 does not take into account the rural population, which accounts for 80 percent of total population in China.

Table 2-3 State Pension Coverage by Ownership (1992-1997 in %)

Year	1992	1993	1994	1995	1996	1997
Total urban employment	68.07	70.03	74.69	76.89	78.40	79.00
SOEs	85.86	86.24	92.85	95.76	95.14	96.66
COEs	33.66	40.46	43.00	46.53	51.47	53.70
Others	20.64	18.48	21.91	27.03	27.48	31.80
of which FIEs[15]	21.25	21.27	24.15	25.00	31.87	

Source: *China Social Insurance Statistics Yearbook*, 1997, Table 2-7.

[14] According to the State Council, all enterprises in urban area have to join the social pool since 1999. In addition, the social pool now has to cover those peasants who work in cities.

[15] FIE refers to "foreign invested enterprises", which includes Chinese-foreign joint ventures and foreign enterprises.

2.4.2 Low Level of Social Pooling

Due to the required pooling, under the current system responsibility for paying pensions is shifted from individual enterprises to groups of enterprises. It must be pointed out that the pooling system does help to share risk across enterprises and reduce the pension burdens of those enterprises with financial problems. However, the redistribution of pension costs was only amongst a relatively small number of enterprises, usually within a city. By the end of 1997, only fourteen of the thirty provinces had introduced different varieties of pooling plans; it is noteworthy that most pension pooling is conducted at the county, municipality or prefecture level. Also, many localities have separate pools for SOEs and COEs. Social pooling at provincial level is only experienced in four provinces, Fujian, Beijing, Shanghai and Tianjin. In fact, it is a county/city pooling scheme rather than a social/national pooling scheme.

Two reasons can explain the low level of pooling. The first is the highly decentralised social insurance system (each province and city has its own social insurance department to handle policy matters as well as its own labour bureau to administer social insurance funds) which readily lends itself to inconsistent enforcement. Many localities intentionally differentiate their schemes from others and introduce non-transparency in order to retain authority over their programs. The weak enforcement power of local insurance agencies makes difficult the tasks of collecting contributions or levying penalties. The second reason is the uneven development. In general, rich localities are unwilling to join the social pooling system due to the surplus in their pension schemes. On the other hand, poor localities have difficulty joining the pool because their provincial governments fear the heavy burden, described by them as "the pension bomb". It is the above reasons that make city pooling difficult and provincial pooling even more so. Although the State Council required that all the pools be extended to the provincial level by the end of 1999, difficulties in reconciling inter-provincial interests will persist for some time and may impede the establishment of a wider pooling system.

2.4.3 High and Variable Rates of Contribution

The limited scale of coverage and a low level of pooling result in a problem of a wide range of high contribution rates across provinces and municipalities as well as enterprises. Enterprises with larger proportions of retirees have higher contribution rates; old enterprises have higher rates of contributions than new enterprises because they have higher ratios of the retired to currently employed. According to the 1997 State Council Document 26, the rate of contributions from employers must be less than 20 percent. However, the average rate of enterprise contributions in 19 provinces was much higher than the state regulation. Table 2-4 shows the rates of contributions for 30 provinces for the year of 1996. There were 25 provinces and municipalities whose average rates of contribution were higher than 20 percent. In comparison to other nations those rates were very high. For example, in 1995 the tax rate was 12.4 percent in the United States, 18.6 percent in Germany, and 16.5 in Japan. For developing countries in Latin America, the Middle East, Sub-Saharan Africa, and Asia the regional averages were about 10 to 12 percent (World Bank, 1996: 12). Singapore had an exceptionally high rate of 40 percent but the funds were mainly used for housing loans for workers. It can be seen from the table that the contribution rates vary across provinces, from 14.75 percent in Hainan to 30.09 percent in Anhui. Even in each province the contribution rates differ across localities and different enterprises. In a province where the pooling schemes are still operated at the county or city level, the minimum contribution rate is 11 percent while the maximum is up to 70 percent (World Bank, 1996).

2.4.4 Notional Individual Account

The current individual account in China acts as a bookkeeping device, keeping track of contributions plus imputed interest (at a rate determined by the government). Generally the money in the account is paid out to current pensioners as soon as it comes in. When an employee reaches retirement age, the accumulation in his or her account (in most cases just pension points rather than real funds) is converted into an annuity and paid to the retiree out of contributions by other, younger workers, who are building their own national accounts. In this sense, the present individual account is still on a pay-as-you-go basis. In fact, the funds in individual accounts are far from adequate in most

localities and in many poor areas the individual account is just notional since there is no money in these accounts. Higher rates of contributions from enterprises can be expected when these people reach their retirement age. Otherwise the government would have to be responsible for part of the pension liabilities, increasing pressure on the future government budgets.

Table 2-4 Rate of Contributions by Provinces and Municipalities in 1996

Provinces/ Municipalities	Employer contribution	Employee contribution	Total Rate of Contribution
Anhui	**27.66**	2.43	30.09
Beijing	18.47	5.06	23.53
Fujian	**22.07**	2.40	24.47
Gansu	16.19	7.22	23.41
Guangdong	15.23	2.91	18.14
Guangxi	15.24	1.77	17.01
Guizhou	**20.83**	2.12	22.95
Hainan	12.64	2.11	14.75
Hebei	**20.67**	2.13	22.80
Heilongjiang	**22.87**	1.84	24.71
Henan	19.96	1.64	21.60
Hubei	14.08	8.19	22.27
Hunan	**20.75**	2.65	23.40
Jiangsu	18.52	3.12	21.64
Jiangxi	**21.88**	2.43	24.31
Jilin	**24.69**	1.56	26.25
Liaoning	**24.92**	2.36	27.28
Neimenggu	15.99	1.84	17.83
Ningxia	19.13	2.36	21.49
Qinghai	**24.31**	2.33	26.64
Shandong	**23.09**	2.49	25.58
Shanghai	**21.96**	3.80	25.76
Shanxi	**20.37**	2.45	22.82
Shanxi	**22.10**	2.02	24.12
Sichuan	**21.73**	2.20	23.93
Tianjin	**20.02**	4.00	24.02
Xinjiang	**25.59**	2.95	28.54
Xizang	18.41	0.57	18.98
Yunnan	**22.01**	2.71	24.72
Zhejing	**23.24**	3.36	26.60
Total	**20.53**	3.05	23.58

Source: Author's calculation based on the data from *China Social Insurance Statistics Yearbook*, 1997.

Note: In bold, the municipalities whose average contribution rates are higher than the international norm of 20 percent.

2.5 Challenges of the Pension System

Following a review of the development of the Chinese public pension system, this section examines the burden of the ageing population and demographic trends on enterprises and the pension system.

2.5.1 High Pension Burdens and SOEs Reform

(a) Increased pension costs

In China expenditures on pensions rose dramatically during the last 10 years of the twentieth Century. As stated earlier the total number of workers contributing to the state pension system doubled from 56 million in 1991 to 104 million in 2000. However, at the same period the total number of retirees receiving pensions grew threefold from 10 million to 31 million . As result, the ratio of workers to retirees decreased from 30.3:1 in 1978 to 3.3:1 in 2000 (Table 2-5). This means that in 1978, 30 workers supported one retiree, while in 2000 only three workers supported one retiree.

It can be seen from Table 2-2 that during the ten years between 1991 and 2000, the annual average increase in pension expenditures reached 30.19 percent. It is noticeable that during the same period the annual average increase in pension contributions was only 27.92 percent. In 1998, expenditure on pension payments to retired workers was even higher than contributions from employed workers. The pension burden shouldered by Chinese enterprises can also be explained by their high replacement rates. Depending on their former employment, a retiree can usually obtain 60 to 90 percent of his or her standard wage (Table 2-6), and in some areas the replacement rate can be as high as 100 percent (World Bank, 1996). Compared with some industrial countries, China provides much higher pension benefits to pensioners covered under the state system, given the low level of GDP in China. Problems of high pension burdens on enterprises are discussed later.

(b) Inadequate pension rights

Due to their heavy obligations, a more urgent and immediate problem is the crisis of pensions in the SOE sector. It can be seen from Table 2-7 that compliance rates declined from 90 percent in the early 1990s to 70 or 80 percent in 1994 and the first half of 1995. Compliance rate is defined as the percentage of enterprises contributing. As addressed in the previous section, most of the funds are organised at the county and city level, so there is no mechanism by which to balance the surpluses and shortages of funds between different enterprises or localities. It is difficult for the enterprises and localities with financial difficulties to provide enough retirement pension for their employees. In these areas, therefore, the basic rights of labourers could not be guaranteed. According to statistics from the Ministry of Labour and Social Security, by the Spring of 1998, of 2.83 million retirees 1.34 million had not been receiving any pensions for up to 6 months and about 709,000 had not been receiving pensions for longer. Total pension liabilities reached 4.675bn Yuan. Thus the system is becoming both inefficient and unfair. Table 2-8 reveals the problem in some of the worst affected provinces.

(c) Hindrances to SOEs restructuring

Another associated aspect of the problem is the slowing of economic growth and enterprise restructuring resulting from the high pension burden and differing contribution rates from enterprises. First, the high and different pension contributions provide an unequal playing field for enterprises. For example, two enterprises in two provinces could pay widely different contributions ranging from 20 to 35 percent. This is equivalent to imposing a value-added tax at widely different rates for the same product. An enterprise may lose competitiveness not because of inefficiency in its core business but because it is in a locality with many retirees. Thus the system will end up allocating resources to enterprises that are not necessarily more efficient but have the advantage of a location with a younger population. China's Northeast region (including the three provinces Heilongjiang, Jilin and Liaoning) is already experiencing competitive disadvantage and low economic performance relative to other regions. Second, the bankruptcy or sale of SOEs raises the difficult issues of how the commitment to pensioners will be honoured (along with the other social obligations of the enterprises). When alternative arrangements are not available, the result is a slowing

down of enterprise reform; neither liquidation nor joint ventures and mergers can proceed smoothly unless the issue of the social obligations of SOEs is settled. In addition, with the accumulated losses of enterprises, the banks are now facing an increasing burden of bad debts that hinder their commercialisation. Thus the dilemma of the policy-makers is increasingly evident: SOEs cannot be efficient unless they face hard budget constraint; the banks cannot be commercialised unless they can enforce hard budget constraints on their borrowers.

In a planned economy where the profits of enterprises were pooled and resources were allocated according to plan, the burden on individual enterprises was not a concern because enterprise budgets were part of the government budget. However, most enterprises are now facing the transition from a central-planed economy to a market-oriented economy. Individual enterprises are increasingly concerned with their profits and losses. Having a large proportion of pensioners will undoubtedly limit enterprises' capacity for operation and expansion. High pension costs are becoming a heavy burden and weakening their competition in domestic as well as world markets.

Table 2-5 Ratio of Workers to Retirees from 1978 to 1996

Year	Workers : Retirees	Dependency ratio (%)	Year	Workers : Retirees	Dependency ratio (%)
1978	30.3 : 1	3.3	1990	5.4 : 1	18.6
1979	16.7 : 1	6.0	1991	5.2 : 1	19.2
1980	12.8 : 1	7.8	1992	4.6 : 1	21.6
1981	11.5 : 1	9.1	1993	4.4 : 1	23.0
1982	10.1 : 1	10.0	1994	4.1 : 1	24.5
1983	8.9 : 1	11.2	1995	3.9 : 1	25.6
1984	8.0 : 1	12.5	1996	3.7 : 1	26.9
1985	7.5 : 1	13.3	1997	3.4 : 1	29.2
1986	7.1 : 1	14.1	1998	3.1 : 1	32.2
1987	6.7 : 1	14.9	1999	3.2 : 1	31.4
1988	6.4 : 1	15.6	2000	3.3 : 1	30.3
1989	6.2 : 1	16.1			

Source: Data for year before 1990 is from unpublished data supplied by the Ministry of Labour and Social Security, P.R. China. Data after 1990 is from Table 2-1.

Table 2-6 Replacement Rates of the Public Pension from 1990 to 1996

Year	1990	1991	1992	1993	1994	1995	1996
Replacement rates (%)	80.6	82.7	83.4	82.4	79.3	77.5	77.3

Source: Unpublished data supplied by the Ministry of Labour and Social Security, April 1999, Beijing, China.

Note: Replacement rate is defined as average pensions of new retirees to their wages in the year preceding retirement. It also can be calculated as the proportion of average pensions of new retirees over the wages of total workers. The definition in this table needs to be identified in next fieldwork.

Table 2-7 Compliance Rates in Selected Municipalities

Municipalities/ Province	Contribution Rates (%)		Compliance rates (%)[2]	
	Employers[1]	Employees	Early 1990s	1995
Beijing	19 - 27	5	95	95
Changchun	21.5	2	91	76.9
Chengdu	22	2	n.a.	80
Chongqing	27	3	n.a.	70.2
Fuzhou	21 - 29	4	95	90
Guangzhou	21.5 - 24.5	2~3	96	n.a.
Hainan	18	3	n.a.	70
Nianjing	18,5	3	80 - 90	80
Shanghai	25.5	4	n.a.	90
Shenyang	18	3	n.a.	80
Taiyuan	18 - 25	3	n.a.	80
Tianjing	20 - 30	4	n.a.	95
Wuhan	26	3	n.a.	90

Source: World Bank, 1996

Note: (1) Contribution rates vary among different enterprises.
(2) There may be some overestimation since SOEs in financial difficulties can negotiate for delayed payment.

Table 2-8 Delays to Pension Payments in Selected Provinces and Industries

Provinces	Numbers of pensioners involved (in person)	Amount of delay on pension payments (million Yuan)	Accumulated pension funds in account	Proportion of pension delay to accumulations (million Yuan)
Coal mine industry	475,935	46,700	279,416	16.71
Hebei	139,173	29,404	291,476	10.09
Heilongjiang	455,483	142,506	363,703	39.18
Jilin	216,080	43,873	87,659	50.05
Liaoning	407,500	78,500	384,208	20.43
Shanxi	79,800	13,062	102,666	12.72
Sichuan	103,356	10,667	192,805	5.53
Xinjiang	119,606	22,101	58,648	37.68
Total	1,996,933	386,813	1,760,581	21.97

Source: Lu, H. P. (1998). *Examining the Delay of Pension Payout in China* (Yang lao Jin Wei He Hui Chu Xian Tuo Qian). China: Jilin Mei Shu Press.

2.5.2 Crisis in Family Support

As mentioned earlier in this chapter, the old-age pension system, despite decades of reforms, only covers 79 percent of the urban working population. The coverage is lowest for workers in COEs, TVEs and private businesses (or individual businesses). Peasants in general are not eligible for the formal state pension. As a result, the majority of elderly people have to rely on their family for financial support.

In a national survey in 1994 on the major sources of income for the elderly (aged over 60 years old), 57.1 percent received financial support from their families, 24.8 percent from work, 15.8 percent from pensions, 1.2 percent from welfare relief, and 1 percent from other sources. For those over 80 years of age, some 86.2 percent had to rely on their families for economic support. About 7.8 percent or 9 million people claimed that they had to depend on others to take care of their daily living needs. Among this group of frail elderly, 88.9 percent had to rely on family for economic support (State Statistic Bureau, 1995: 66). Compared with the urban elderly, elderly people in rural areas are more economically dependent on their family members or they work to support themselves. Table 2-9 compares the different income sources of the elderly in cities, towns and villages for the year of 1987; it indicates that family support is very important for them all. However, unlike those in cities and towns, old-age people have little financial resource from pensions, which account for half of income for urban people.

Table 2-9 Source of Income for the Elderly in 1987 (%)

Income source	Cities	Towns	Villages
Working income	6.8	7.1	**26.2**
Pensions	**56.1**	**47.5**	2.5
Spouses	13.0	14.3	3.0
Children	**22.4**	**27.8**	**67.5**
Relatives	0.3	0.6	0.8
Government	1.4	2.8	0.1
Total (%)	100.0	100.0	100.0

Source: Lei, J. Q. (1994). *The New Changes of Marriages and Families in the Chinese Countryside Since the Reform of the Economic System* (Gai Ge Yi Lai Zhong Guo Nong Cun Hun Yin Jia Ting De Xin Bian Hua). Beijing: Beijing University Press.

However, family support is affected by a variety of social and economic changes, which invariably erode the capacity of Chinese families to provide care for their vulnerable members. The changing context centres on the following issues.

The first is the shrinking family size in urban areas. Recently, young married adults in cities have tended to prefer to live separately from their parents after marriage. Similarly, elderly people who are economically and physically more independent prefer to live separately from their children. According to the 1987 national survey, 82.2 percent of the elderly population (aged over 60 years old) were living with their children, while that figure had dropped to 70 percent by the time of the 1990 census. In 1987, 16.3 percent of the elderly people lived apart from their children (3.4 percent lived alone and 12.9 percent lived with their spouses). In the 1990 census the percentage of elderly people living apart from their children had increased to 25 percent. This resulted in a shrinkage in family size in China, decreasing from 4.29 persons in 1964 to 3.96 persons in 1990 and declining further to 3.74 persons by 1995 (Tian, 1991). In 1998, the number of people in a household decreased to 3.16. In Shanghai, the household size was 2.89 persons (National Bureau of Statistics, 1999). In terms of family structure, almost three-quarters of the families in China are now nuclear (a family with two adults and one child).

The second issue is that of increasing labour mobility in rural areas. The "Household Registration System" implemented in 1958 was effective in restricting rural peasants from entering cities for jobs. Due to a variety of factors including population increases, encroachment on farmlands by urban development, and the harsh living conditions of agricultural work, the problem of surplus labour in rural areas is becoming critical. At the same time, because of the requirement by the cities for cheap manual labour, the restrictions on peasants to move into cities and towns for jobs have been relaxed. Over 100 million peasants are now working in cities. Most of them go to the cities by themselves, leaving behind their family members in villages. It can be expected that with the speed of urbanisation and industrialisation, as more young peasants go to cities for jobs leaving at home their aged parents, more and more old-age people will be *"abandoned"* (Leung, 1996).

The changes in both urban and rural China described above imply that the government should consider the declining capacity of the family to support the elderly and recognise the emerging need for a new pension system to be developed.

2.5.3 Increasing Pressures from the Ageing Population

(a) Birth rate trends

High birth rates result in an ever-growing population, with the young outnumbering the old. Low birth rates, on the other hand, signify slower population growth or even contraction. If a population is growing slowly or contracting, the result will be a general ageing of the population. Since the 1970s the one-child policy has been adopted in China. Although the population control policy has faced a great resistance in rural areas, it has substantially reduced the birth rate from 39.1 per 1,000 in 1964 to 17.1 per 1,000 in 1995. Likewise, the fertility rate for each woman has declined from 5 children in 1970 to 1.7 children in 1995 (Leung, 1995). As a consequence, the natural population growth rate decreased from 27.6 per 1,000 to 10.6 per 1,000 over the same period and decreased further to 9.53 per 1,000 in 1998. As increasing numbers of women participate in the labour market and vigorous population control policy continues, fertility rates can be expected to decline further, which is to say, future generations will not raise enough children to support themselves.

(b) Life expectancy trends

In addition to the general decline in birth rate, extensions in life expectancy will drive up the number of elderly in both relative and absolute terms. Life expectancy increased from about 50 years in the 1950s to 76 years in 1995. The tremendous increase in life expectancy in China is the result of advances in medical science, improvements in public health services, particularly the control of infectious diseases, the reduction of infant mortality and a rapid rise in general living standards. As medical science devotes more resources to the studies of diseases of old age, further gains in life expectancy can be expected, to 80 years by 2040 (see table 2-10). For a public pension scheme, the increase in life expectancy at birth means that the government must take care of more

old people, and increase in life expectancy in retirement means the government must look after the old for longer than before.

(c) Growth of elderly population

As a consequence of reduced mortality and the continuing one-child policy, a long-term ageing process is expected in China. The speed of the increase in the proportion of elderly people is of great concern to the Chinese government. By the end of 1998, the population over the age of 60 was 83,620,000. The annual growth rate of the elderly population, aged over 60 years old, was 33.7 per 1,000, more than three times the overall population growth rate of 10 per 1,000 (China Population Statistics Yearbook, 1999). Shortly after the turn of the twenty-first Century, members of the baby-boom generation will begin to reach their 60's and a continued expansion of the elderly population in both absolute and relative terms can be expected. Table 2-11 shows the increasing trend of the elderly population over the age of 65 between 1953 and 2000 and the portion of this age group for selected future years until 2050, as projected by the People's Insurance Company actuaries in China. It can be seen that during the second half of the twentieth Century the population over age 65 increased by approximately 2.6 percent. However, there will be an average increase in this portion of the population of about 3 percent every 10 years after that. The number of the elderly is expected to rise from about 89 million in 2000 to 292 million by 2050. James (1997) states that it will take about 33 years for the share of population over 60 to double from 9 to 18 percent. However, similar increases took at least 80 years in other developed countries, 85 years in Sweden, 98 years in Denmark, 100 years in Italy, and about 140 in France.

The fast increase in population ageing will result in a fast increase in public pension expenditure. As the World Bank argues, in developed countries the ageing of the population usually came after industrialisation and the process unfolded at a slow pace. However, in China it comes at a time when the nation is industrialising and economic construction demands capital (World Bank, 1996). This makes allocating resources very difficult.

(d) Increasing old-age dependency ratio

What worries the government most might be the increasing trend of the old-age dependency ratio, a numerical relationship of old people to those in employment. In Table 2-12, the old-age dependency ratio is defined as the population of 65 years of age and over to the population of those aged between 14 and 64. It shows that the labour force (the population between ages of 14 and 64) increases from 1953 to 2010. After that, the proportion of this age group in the total population will begin to decrease as the "baby boomers" born in 1950s reach their retirement between 2010 and 2050. Likewise, the older group (age 65 and over) will increase steadily from 8.2 percent of total population to 20.6 percent at the same period. Therefore, a high increase in the dependency ratio is expected during the first half of this Century. We can see from the table that the ratio of labour force (age group 14-64) to pensioners (age group 65 and over) declines from 10 to 1 in 1995 to about 3 to 1 by 2050 (also see Figure 2-1). With the rising dependency ratio, the work force faces a heavy burden.

Unlike the pension dependency ratio described in earlier sections, the old-age dependency ratio used here does not necessarily represent the relationship between those who receive pensions and those who contribute to them. However, it takes into account the situation in the domestic labour market and more accurately represents the extent of the pressure from the burden of ageing, or the extent to which the total retirees have to be supported by working people.

Table 2-10 Life Expectancy at Birth and Age 60, Selected Years

Year	Life expectancy at birth	Life expectancy at age 60
1995	69.9	16.6
2000	70.7	16.8
2010	72.2	17.4
2020	73.5	18.2
2030	74.8	18.9
2040	76.9	19.7
2050	78.3	20.1

Source: World Bank, 1996

Table 2-11 Population of Age 65 and over for Selected Years

Year	Population 65^+ (10,000)	% of total population	Year	Population 65^+ (10,000)	% of total population
1953	2,504	4.4	2000	8,913	7.0
1964	2,458	3.6	2010	11,136	8.2
1982	4,928	4.9	2020	16,474	11.4
1985	5,557	5.3	2030	22,586	15.3
1987	5,866	5.4	2040	29,378	20.1
1990	6,319	5.6	2050	29,240	20.6
1995	8,091	6.7			

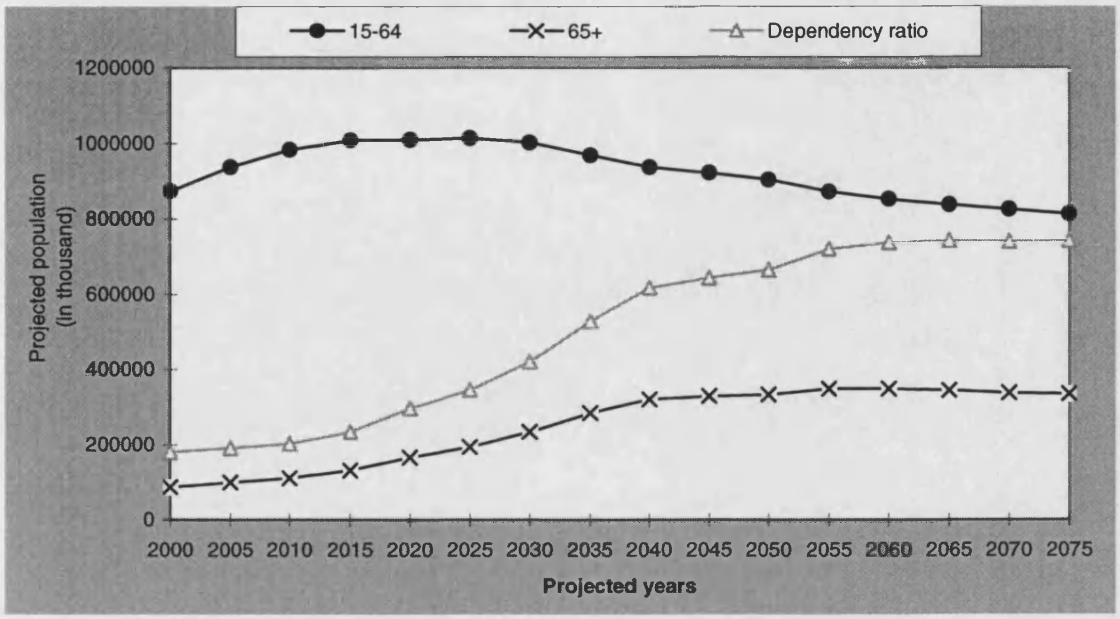
Source: Cui, L. F. (1998), *Fiscal Burden on Ageing Population* (ed.). China: Jilin Mei Shi publishers.

Table 2-12 Population Rates and Dependency Ratios for Selected Years

Year	14-64 over total population (%)	65^+ over total population (%)	Dependency ratio (%) $65^+/(14\text{-}64)$	14-64 : 65^+
1953	56.3	4.4	7.8	13 : 1
1964	61.3	3.6	5.9	17 : 1
1982	63.7	4.9	7.7	13 : 1
1990	64.1	5.6	8.7	11 : 1
1995	66.6	6.7	10.1	10 : 1
2000	67.7	7.0	10.3	9.7 : 1
2010	71.1	8.2	11.2	8.7 : 1
2020	69.3	11.4	16.5	6.1 : 1
2030	67.1	15.3	22.8	4.4 : 1
2040	63.4	20.1	31.7	3.2 : 1
2050	63.1	20.6	32.6	3.1 : 1

Source: Author's calculation based on data from Cui, L. F. (1998). *The Fiscal Burden of Ageing Population* (ed.). China: Jilin Mei Shi publishers.

Figure 2-1 Projected Old Age Dependency Ratios from 2000 to 2075



Source: *Long-range World Population Projections* (The United Nations, 2000).

2.6 Conclusion

This chapter described the fundamental changes in the Chinese insurance-based state pension system during the second half of the last Century. It also pointed out the basic problems of the current state pension system as well as its future difficulties arising from an ageing population.

Among the low-income nations, China is almost unique in having an extensive and generous programme of pensions for its urban work force. In the past, the enterprise-based social security pension was seen as an advantage of the socialist economy. However, it is now seen as being responsible for depressing economic growth as pension costs add to the burden of enterprises, especially the SOEs. With economic reform, problems with the generous enterprise-based pension system become evident. It is even more severe in older enterprises that face difficult financial conditions in their core businesses due to technical and economic changes. High rates of contributions and unfunded pension (and other social insurance) liabilities are seen as a financial impediment to enterprise reform and competitiveness. Therefore, a solution has to be found to detach the enterprises from their social welfare obligations, of which pensions are an important component.

As China attempts to move towards a market-oriented economy, the issue of how pension policy affects the efficiency and productivity of enterprises becomes crucial. As the losses of SOEs mount, there is a great urgency for solving the pension problems. Also, profound social and economic changes have brought about a marked impact on the Chinese family units that provide traditional family welfare to the elderly. Moreover, the demographic changes and particularly the ageing population will put higher pressures on the existing pension system.

This thesis suggests that the responsibility for provisions of retirement income must be shared between the government, enterprises and individuals. In other words, the promotion of a funded private pension system in which current contributions are closely linked to future benefits is one of the possible solutions to the current pension problems in China. This suggestion is reflected in most proposed reform of social security systems in OECD countries, which seek to retain the basic state pension but reduce its scope and transfer some of the burden of providing retirement income to private pensions. The next chapter carries out a comparison between private and public pension systems.

III. LITERATURE REVIEW ON THE ISSUE OF PENSION MIX

3.1 Introduction

The pension ideology aimed at promoting private pensions conforms to the principle of future pension reform required by the Chinese government as early as 1991 when the State Council issued Document 33. This document called for an establishment of three tiers in the pension system: a basic benefit, a supplementary benefit to be provided by enterprises in sound financial conditions and a benefit based on personal savings. Afterwards, several documents[16] were issued by the State Council and the Ministry of Labour specifying the role of the supplementary pension system. According to the State Council, the supplementary pensions including those of enterprise supplementary pensions and individual saving plans should be an important complement to the state pension system; the latter being the principle part of the pension system providing benefits for basic living, the former aiming to improve the living standard of the retired population. Under the requirement of the State Council, by the first decade of the twenty-first Century, China must set up a pension system characterised as 'low level, wide coverage and three tiers'.

The system would be 'low level' in that it cannot undertake the whole pension responsibility for employees and should aim only to meet basic protection requirements for retirement. Contributions from both employees and employers must be designed on the grounds of the national economic level, the capability of the government's and enterprises' budgets and the participants' incomes. 'Wide coverage' includes enlargement of the pension scheme to each province, covering all employees of government body, institutions and organisations, State-Owned Enterprises, Collective-Owned Enterprises, Foreign-Investment Enterprises and the self-employed. The 'three tiers' include a basic state pension, a supplementary pension provided by enterprises and a savings-based individual pension. Local governments should encourage enterprises to arrange a certain pensions for their employees and guide individuals to save for their

[16] Those documents include State Council Document 6 of 1995 and State Council Document 26 of 1997. MOL Document 164 of 1995 was by the Ministry of Labour to guide the establishment of enterprise supplementary pensions at the end of 1995.

retirements through fiscal privileges. Under this principle the responsibility for pensions must be shared among the government, enterprises and individuals.

This chapter discusses the issue of pension mix as a background to the tax analysis on fiscal incentive, regulation, costs of tax incentives and policy choice conducted in the following chapters. This chapter has two objectives. The first is to compare the relative advantages and disadvantages of different pension schemes from the viewpoint of individual workers. The second objective is to analyse the impact of pension funds on capital markets, a very important issue for the Chinese economy. The discussion focuses on the long-term capital market and the financial market in general.

Chapter 3 is structured as follows: Section 2 examines the advantages and disadvantages of public versus private systems, defined benefit versus defined contribution plans and pay-as-you-go versus funded plans. The issues of potential risks, the expected rate of return to contributions, the rate of coverage and the incentive to save under each kind of pension plan are assessed. Section 3 addresses some important macro-economic issues relating to funded pensions, notably, the link to savings and economic growth and the interaction with the financial markets. The conclusion section follows.

3.2 How Would Private Pensions Affect Individual Workers?

This section compares the advantages and disadvantages between publicly managed programmes and privately managed programmes, defined benefit plans (DB) and defined contribution plans (DC), pay-as-you-go (PAYG) based plans and advance funded plans. The comparisons are based on the following assessment criteria: full coverage, low risk, high saving incentives and high contribution returns, chosen because of the problems inherent in the current Chinese pension system. As a way of social policy, the system does not provide the entire population with an equal opportunity of participating in the state pension and therefore is unsatisfactory in allocating income resources as well as eliminating poverty, especially among the elderly. As a means of saving, the current system fails to maximise returns on contributions. As a form of insurance, the system fails to minimise risks to contributors. Finally, the current system is not able to create high saving incentives for both employers and employees and is

therefore not financially sustainable. The comparisons are summarised in the table below and discussed in detail in the rest of this section.

Table 3-1 Comparison of Different Types of Pension Programmes

Assessment criteria	Public *versus* Private		DB *versus* DC		PAYG *versus* Funded	
	Public	*Private*	*DB*	*DC*	*PAYG*	*Funded*
Coverage	Higher	Lower	- (1)	-	-	-
Benefit adequacy	Higher	Lower	-	-	-	-
Poverty elimination	Higher	Lower	-	-	-	-
Return to contribution	-	-	-	-	Lower	Higher
Vulnerability to political risk	Higher	Lower	-	-	Higher	Lower
Vulnerability to investment risk	Lower	Higher	Lower	Higher	Lower	Higher
Vulnerability to inflation risk	Lower	Higher	Lower BR Higher AR (3)	Higher BR Lower AR	Lower	Higher
Incentive to save	Higher for low-income workers	Higher for high-income workers	Higher for workers with low job mobility	Higher for workers with high job mobility	Higher for old workers (2)	Higher for young workers

Source: This table is partly attributed to the 1994 World Bank publication: *Averting the Old Age Crisis.*

Note: (1) - indicates not comparable or no remarkable difference between the two types of plans in comparison. For example, there is no clear evidence that suggests that either public schemes or private schemes generate higher returns after adjustment for administrative costs.

(2) "old workers" refers to those who are in middle age and close to retirement.

(3) "BR" and "AR" refer to before retirement and after retirement respectively.

3.2.1 Pension Coverage

With regard to pension coverage there is no clear division between DB and DC, nor between PAYG financing and advance funding. Therefore, the discussion in this section takes place through a comparison between public and private pensions in general. It must be noted that private pensions discussed in this thesis include both voluntary private pension plans and compulsory, mandated occupational schemes.

Public pensions in most industrialised countries cover almost the entire population. The flat-rate benefits are payable to retirees based on conditions of either citizenship or contribution record and the earnings-related plans cover all the economically active and their dependants. Private pensions, on the other hand, have not covered the entire population or even the entire labour force. Table 3-2 reports different rates of coverage between public and private pensions in some member countries of the OECD. It shows that, with the exception of Germany and France, all the observed countries have a basic public pension available for all citizens. While the percentage of employees covered by private pensions varies widely (from 23 percent in countries such as New Zealand to some very high rates of coverage in France and Sweden) it should be pointed out that none has yet achieved 100 percent coverage of total populations under private pension plans.

One important reason for the low coverage of private pension plans is the unequal status amongst workers with access to them. The inequality arises from the institutional features of private pensions. This is due to the non-government sponsored pension, especially the occupational pension, providing benefits which are conditioned by individual work histories (e.g. earnings and job tenure) and also are highly differentiated by both occupation (e.g. type of job) and workplace (e.g. sector). Those differences in occupation, earnings and job tenure, and also differences in mandation result in a disparity of pension coverage and participation between workers. The following are observations from the history of the private pension industry in some OECD countries which may have some implications for China.

Table 3-2 Coverage of Public and Private Pensions in Selected OECD Countries

Country	Public pension scheme [1]	Private Pension scheme [2]	
		Compulsory	Voluntary
Canada	All citizens & employees		45% (in 1993)
Denmark	All citizens & employees	80%	
France	Employees [a]	100% ARRCO/AGIRC [b]	
Germany	Employees [c]		50%
New Zealand	All citizens & employees		23% (in 1987)
Sweden	All citizens & employees	90% (ATP; ITP/STP) [d]	
UK	All citizens & employees	50% (company)	20% (personal)
USA	All citizens & employees		58.8% (in 1988)

Source: Selected from Davis 1995, Hansen 1998 and OECD 1998b: pp.46-48.

Notes of the author:
(1) The public pension in most industrial countries includes a basic provision for all citizens, and an additional public pension scheme which covers the economically active group. The definition of public pension includes social assistance.
(2) The proportion of employees covered by private pensions; the number in columns 3 and 4 of the table indicates the coverage of labour force only.
a. French public pension provides earnings-related benefits for employees.
b. The ARRCO is a supplementary pension that regroups forty-six pension systems and the AGIRC a supplementary pension system for middle managers. Both are operated on PAYG defined benefit basis.
c. In Germany, the public pension is basically for employees in the private sector and specific groups of self-employed.
d. The ATP is a *publicly* directed 'National Supplementary Pension Scheme'; it is a form of earnings-related social-security scheme. The ITP and the STP are supplementary private pension schemes which cover virtually the entire labour force. The ITP system covers white-collar workers, while the STP system is responsible for blue-collar workers.

(a) Inadequate coverage in small industries

Statistics show that coverage is higher in the public sector than in the private sector (see Dakin, 1994 and OECD, 1993b for detailed discussion Within the private sector, coverage is generally very high among large organisations and relatively low among small firms. Table 3-3 provides the statistics of participation by size of firms in two countries with well-developed private pension systems, the UK for 1987 and the United States for 1988. It shows that the rate of coverage increases with firm size in both countries. It ranged from 27 percent in small firms to more than 80 percent in larger organisations. This means that private pensions play a less important role for people who are employed in small enterprises.

Table 3-3 Coverage According to Size of Establishment in UK and US
(Private sector, full time employees, in thousands)

Size of establishment (number of employees)	***Employees***	***Members***	***Percentage of members***
The United Kingdom			
1-2	390	80	27
3-24	3,590	890	25
25-99	2,990	1,270	42
100-999	3,680	2,290	62
1,000 and over	1,250	1,040	83
The United States			
< 100	34,100	9,100	26.7
100 and over	58,800	46,400	78.9

Source: (1) Dakin (1994: 21). *Pension Provision in Britain.*
(2) OECD (1993: 25). *Private Pensions in OECD Countries: The United States.*

(b) Inadequate coverage of low-income earners

Another, almost universal, feature of pension participation throughout the world is that of the small percentage of lower-paid workers covered by private pensions. Because the system is voluntary, employees with higher incomes are more likely to receive private pension benefits at retirement, linked to their paid contributions. Thus private pensions are said to discriminate against low-income workers. In the United States, for example, private pension coverage rates increase steadily for workers with higher incomes, moving from 22 percent for those earning less than $5,000 to 80 percent for those earning $50,000 and over (Table 3-4). This indicates that private pension benefits are an important source of retirement income for highly paid people, while lower-paid workers rely on public pension schemes, especially social security programmes. In the United States, social security benefits replace a higher percentage of pre-retirement earnings for low-paid workers. Thus, the tilt in the private pension system towards higher income earners is offset to some extent, by the benefits provided through the Social Security system to virtually all workers at retirement.

Table 3-4 Participation in Tax-deferred Pension Plans in the United States
(By level of Earnings, non-agricultural wage-and-salary workers, 1988)

Annual earnings ($)	*Percentage of all workers*	*Percentage of eligible workers*
1-4,999	1.0	22.2
5,000-9,999	3.5	32.5
10,000-14,999	8.0	41.7
15,000-19,999	14.3	50.6
20,000-24,999	20.1	56.8
25,000-29,999	24.0	58.5
30,000-49,999	33.1	67.0
50,000 and over	45.1	79.8

Source: Cited from Table 10 in the OECD (1993: 29) *Private Pensions in OECD Countries: The Unites States.*

(c) Inadequate coverage of women

Table 3-5 provides the statistics of participation by gender in three countries, the UK for 1991, the United States for 1988 and Germany at the beginning of 1990s. It shows that the United States had the highest overall rate of private pension coverage (58.8% of the total labour force) during the 1980s. More importantly, the different coverage rates between men and women show that women are less likely to be covered by private pension plans. The rate of coverage for men was highest in the United States (61%), followed by the UK (57%) and Germany (55.9%). However, all three countries had a rate of coverage of less than 50 percent for women. In Germany, private pension plans only covered 1/3 of those women in the work force. The low coverage rate for women is the direct consequence of their short job tenures and low earnings.

In the UK, although women's membership of occupational pension schemes has risen since 1945, the gender gap in occupational pension membership remains marked and since the early 1980s, women's membership levels have stagnated. In 1994, 38 percent of full time female employees were members of an occupational scheme compared to 56 percent of males. However, the average payments that women receive from an occupational pension are low. Data suggest that the average amount received from an occupational pension by women was £31 a week compared to £71 a week received by men (Falkingham and Rake, 1999). As consequence of both lower membership of

schemes and lower benefits at payment, women rely more on means-tested social security benefits and their husbands' pensions.

In Germany, for another example, women's economic position in the state system is most likely to depend on derived benefits from their status as widows. Some 40 percent of all female beneficiaries receive survivor benefits which have a lower value than earned benefits. But the size of women's earnings in the labour market is hardly enough to earn them entitlement in the private occupational pensions - only 7 percent of women in the private sector have a private pension compared to 40 percent of male pensioners who worked in the private sector. Therefore it is argued that women do best financially in retirement if they marry well. The marriage market, rather then the labour market or the welfare state seems to assure women an adequate income in retirement (Rein and Wadensjö, 1998). At present, women's issues present a continuing concern for many who are interested in pension policy.

By examining the experience in OECD countries, one can expect the same pattern in China - the higher the status and pay, the more likely it is that a worker will be contributing to a private pension plan. Membership of non-state schemes would also be higher in public than private sector employment, capital than labour intensive industries and large than small companies. Provision in the financial services, such as the banking and insurance industries, may also be better than in other sectors. Therefore, it can be expected that the private pension scheme in China, if voluntary, may benefit higher paid workers in large companies, with the lower paid in small companies least likely to be included. The rate of coverage in enterprises and areas with sound financial conditions would be higher than that in poor performing enterprises and less developed municipalities and provinces. Sufficient coverage of the small businessman and the self-employed would be typically difficult. In addition, those workers who are part-time, low-income earners and close to retirement may receive barely adequate benefits from non-government sponsored pension schemes, even when plans are mandated.

Table 3-5 Pension Coverage as a Percentage of the Work Force
(by Gender, in the UK, the US and Germany)

Gender	*United Kingdom (1991)*	*United States (1988)*	*Germany*
Men	57.0	61.0	55.9
Women	37.0	48.0	33.1
Total	48.0	58.8	48.5

Source: 1. OECD (1993). *Private Pensions in OECD Countries: The Unites States,* Paris.
2. Dakin (1994). *Pension Provision in Britain,* London.
3. Reynaud (1994). *Comparing Social Welfare System in Europe.* Oxford.

3.2.2 Risk and Uncertainty

Pension plans involve different kinds of risks arising from enormous uncertainties. This section tries to answer the following three questions: Which pension system is more susceptible to political risk? Which scheme is more vulnerable to investment risk? Which scheme is more effective in protecting benefits against price inflation?

(a) Political risk

It is not easy to give a clear definition about the concept of political risk. Put simply, political risks occur when pensioners do not receive benefits or receive less than they should have, due to the failure (or change) of government policy. Unlike any other risks, political risk is harder and more difficult to predict because each country has different traditions and institutions. The following are examples of political risks which can be found in any type of political or economic system.

- The state fails to make necessary and timely adjustments according to changing economic conditions, such as increases in inflation and labour productivity;
- Increases in contributions or taxes and cuts in benefits according to demographic trends of ageing population, longer life expectancy and high dependency ratio;
- Adjustments in pension policies that respond to developments not directly related to pensions, e.g. budget deficit;
- Pension rights are reneged or abolished due to political upheavals.

Since public pensions are not usually funded and the source of benefits is from taxation or contributions of existing workers, it is generally believed that public schemes and especially PAYG schemes are more liable to political interruption. In the United Kingdom, for example, due to the changes to the state pension, those who entered the labour market in 1978 receive on retirement a state pension less than half that implicitly promised to them when they started work (Gary, 1999). In China the benefit rates of state pension have changed frequently over the past 50 years. Before the 1990s, the replacement rate increased from 35-60 percent in 1951, to 60-85 percent in the 1980s. Meanwhile, it decreased from about 83.4 percent in 1992 to 77.3 percent in 1996 (see Table 2-10 in Chapter two). According to government policy for further reform, the replacement rate will be decreased even further, to 58.5 percent by the year 2033 (Yu, 1998). In the United States many of the younger generation are worried that Social Security will not provide currently promised benefits (Mitchell and Zeldes, 1996). Recent reforms in many OECD countries have substantiated this worry. These were aimed at returning to basic principles, such as focusing basic pensions on the very needy and making insurance-based schemes more dependent on contributions. The main policy options within the public and PAYG framework are decreasing benefit levels, reducing eligibility and increasing contributions (see Table 3-6).

The fundamental point is that public pensions do not always provide a secure income for pensioners, whilst private pensions are less vulnerable to political risks in which benefit promises may be reneged on. Under PAYG-based plans, changes such as increasing dependency ratio, high unemployment rate and low economic growth often lead to reductions in benefits. However, advance funded pension plans are less likely to be associated with political risk as they are generally funded (unless there are changes in government tax rules or serious political upheavals) but they are more likely to suffer from investment and inflation risks, which are discussed next.

Table 3-6 Selected Recent Reforms in OECD Countries

Reduction in the generosity of pension payments	Countries
Reductions in the final benefit available after the usual number of years of work and/or contribution	Canada, Finland, Germany, Italy, Norway, Portugal, Sweden, New Zealand, UK
Less generous adjustment of benefits to changes in inflation	Finland, Germany, Japan
Increases in the level of contributions and/or years of employment required to generate the same level of benefits	Finland, Portugal, Turkey
Increases in the number of years of earnings used to calculate final pension payments	France, Spain, Sweden
Change in the benefit calculation to adjust for increases in the average life expectancy of new cohorts of retirees	Sweden

Source: Selected from OECD, 1998.

(b) Investment risk

Both publicly and privately managed funds are subject to investment risk. However, the causes of the risk to the two funds may be different. Under publicly organised and administered programmes investment risk may result from the misuse of funds, e.g., state and local governments borrow from their pension funds to cover deficits (Munnell and Sunden, 1999). It may result from investment decisions guided by political, rather than economic considerations (Banks and Emmerson, 2000). Also, it may result from the failure to achieve portfolio returns on the risk-return frontier. For example, public funds are often required to invest in government securities or used in failing state enterprises at low nominal interest rates that become negative real rates during inflationary periods (James, E. 1998).

In comparison to publicly managed pensions, privately managed funds would give households more control over how their retirement funds are invested and enable them to select a more efficient portfolio and to attain a better point on the risk-return frontier. Because of differences in tastes across households, this would be superior to the implicitly uniform portfolio rule of the public trust. Although, in some cases, individuals

are not well informed of, or have little to say about, their contribution allocation strategy, fund managers still invest pension funds following a high return principle, rather than being guided by political decisions. However, private pensions are also subject to investment risk for the following two reasons. First, in an environment with weak capital markets, less informed investors, less sophisticated experts and less regulatory capacity, privately managed funds may not perform as well as expected. The market may also perform badly. Also, they have the risk of fund abuse as well as company bankruptcy. This suggests that a privately managed fund may not involve smaller potential risks than one publicly managed. Therefore, many pension scholars such as Davis, E. (1995); James, E (1997) and Heller (1998) emphasise that government regulations are necessary to avoid investments which are overly risky and managers who are fraudulent. The problem of abuse and fraud should not be discounted, particularly in developing countries where capital markets are underdeveloped. Second, private pensions have higher administrative costs than public pensions. It is widely believed that pensions based on individual accounts have higher administrative costs than those based on group insurance. Orszag and Stiglitz (1999) argue that "...the rate of return on a funded private system is likely to be lower than under the public system because higher administrative costs reduce the net rate of return an individual receives." The effect of administrative cost on return to both public and private pensions will be further discussed in Section 3.2.3. Third, company pensions are more vulnerable to the risk of misuse of funds and personal pensions have a risk of miss selling.

When a DB scheme is compared with a DC scheme the answer is rather complex. It depends on the risk-sharing features between pensioners and scheme sponsors. A DC scheme is a pension that provides benefits to pension members dependent solely on returns on assets invested, usually based on a regular contribution of a fixed proportion of salary. In contrast to a DC scheme, a DB scheme is independent of returns on pension assets invested. The benefits paid to pension members depend on a fixed amount or proportion of final salary in advance, usually based on years of service and average or final salary.[17] The two schemes differ in the way in which benefits are calculated when

[17] It must be noted that there is a targeted money purchase scheme. It provides minimum, rather than maximum, benefits to members. The amount of pension that exceeds the minimum benefits to pension members after their retirement depends on the investment performance of the pension fund operated by the manager. In addition, members can also gain the accrual of fund assets. This implies that pension

the pension member retires. Most importantly, they are different in the distribution of risk between the pension member and the pension provider/sponsor (Blake, 1996: 4).

In the DC scheme the amount of pension benefits paid to the member is determined by the full value of the fund's assets, which all depends on the investment performance operated by fund managers in the market. The member's benefit varies with market returns. The higher the return from fund assets invested, the more the payments to the pension member and vice versa. This means that the pensioner's benefit is not protected since the pension provider has no responsibility to make up the shortfall if there are severe market losses. Thus, there is no risk-sharing feature between the member and the sponsor in the DC scheme. The sponsor does not bear any risk from fund investments nor enjoy the high returns from the success of investments. Instead, the member must bear all the risks of fund investments though gain the whole returns generated from the market. In the case of a stock market crash just prior to retirement, the risk to DC plans may be severe. For example, pensioners in the UK who retired in 1974 often had pensions less than half the value of pensions received by those retiring in 1973 (Davis, 1995: 7).

Whereas in the DB plan, the scheme sponsor pays benefits to the member based on factors such as the final salary, the length of pensionable service and the age of the member. Under such a pension scheme, the benefit that the member receives after his or her retirement is not calculated in relation to the value of the assets in the fund, it is fixed. Consequently, the member's interests are protected. It appears that when there is a decline in the fund value or when the fund liabilities increase, the sponsor needs to top up the fund to keep it in actuarial balance. Therefore, in a DB scheme, again there is no risk-sharing character between the pensioner and the sponsor. The pensioner does not bear any risk from fund investments, nor can he or she benefit from the returns of fund investments. The scheme sponsor bears the whole risks of the fund's investment, paying benefits to members even if the accumulated fund proves inadequate for all vested

benefits to the pension member have no ceiling but a floor. The higher the return from the market, the higher the pension received by the member. At the same time, the sponsor bears all risks from fund investment but does not enjoy any asset returns. This kind of pension plan is obviously preferable to members but not to sponsors since they are not in an equal position in risk-benefit sharing. This is why the TMP scheme is not very popular in the pension experiences of any country.

rights. However, the sponsor also gains all market returns. In practice, most OECD countries such as the United States, Canada, France, Japan and Switzerland have insurance of DB pension rights against default risk for the sponsoring firm. Insurance of benefits of DC pension plans is not necessary as there is no fixed pension right to guarantee (Davis, 1995: 108). Therefore, in theory, from the point of view of individual workers a DB scheme is not subject to investment risk. In practice, however, a certain degree of risk still exists within a DB scheme. For example, the sponsor would probably change the types of pensions if there were any change in economic situation, tax regulation and investment policies on pension funds. For instance, due to the suspension of tax credits on dividends in July 1997, many employers in Britain have altered the benefits to their employees from a DB scheme to a DC scheme because of the rising costs after the tax change (Merrell, C. "Swift Response to Chancellor's Raid", *The Times*, 5 July 1997). If a DB plan is under-funded, the sponsor is allowed to change the rules of the scheme, including the benefit accrual rate.[18]

(c) Inflation risk

If pension benefits are not inflation-indexed, the nominal return from an investment will be eroded by inflation and will sometimes generate a negative real rate of return. If this happens, the purchasing power of the capital accumulation declines rather than expands. By the time the worker retires, the pension that can be paid will be far less than the retiree's wage and will purchase far less than it could have if the money were spent in earlier years.

The risk from inflation is present in both public and private pension systems. However, the government and the private sector have different power or abilities in dealing with insolvency in relation to price inflation. Most countries, indeed, have introduced some sort of automatic benefit adjustment mechanism into the social security program to deal more effectively with the inflation problem. The table below (Table 3-7) reports the method of benefit adjustment for old-age protection in 14 members of the European Committee. All member countries have annual adjustments of pension benefits to either

[18] It should be noted that all the changes only apply to new benefit accrued (World Bank, 1994: 187-198).

prices or wages.[19] The UK government has to adjust pensions by legislation at least once a year in line with the movements in the general level of prices. In Belgium and Luxembourg pension benefits are automatically adjusted whenever prices have increased to a certain level.

Table 3-7 Benefit Adjustment for State Pension in Selected Countries (1998)

Country	Benefit adjustment basis	Country	Benefit adjustment basis
Austria	Annual adjustment to change in net wage	Italy	Annual adjustment based on the development of the cost of living
Belgium	Automatic adjustment of 2% whenever the average CPI varies by 2% in relation to the preceding index.	Luxembourg	Automatic adjustment to price development whenever the index varies by 2.5% in relation to the preceding index.
Denmark	Annual adjustment according to change in wage level	Netherlands	Adjustment twice per year in accordance with the average development of contract wage
Finland	Annual adjustment on the basis of the evolution of the cost-of-living	Portugal	Annual adjustment to price level
France	Annual adjustment to CPI	Spain	Annual adjustment to CPI
Germany	Annual adjustment to change in wage	Sweden	Annual adjustment to change in price
Ireland	Increase once a year	UK	Adjustment at least annually in line with change in price level

Source: EC (1998). *Social protection in the Member States of the European Union.*

The degree to which pensioners' benefits are protected against price inflation depends on whether pensions are indexed to price inflation or wage and also whether the indexation is full or partial. Under price indexation, pensions move with the level of prices so that the real values remain unchanged. Under wage indexation, two problems may arise - if wage increases do not keep the same pace with prices and if pensions are indexed in nominal terms rather than in real terms. In both cases, the real value of pension benefits declines during inflationary periods. The World Bank (1994: 85) estimated that the real value of a pension that is fixed in nominal terms is reduced to

[19] In Switzerland, there is a fifty-fifty combination of wage and price indexation.

only half the amount in seven years if the rate of inflation is 10 percent. And with annual inflation of 100 percent, the real value would be totally eroded in nine years.

In China, the pension formula of the current public scheme is defined in advance. The benefit depends on years of employment and salary over certain periods (i.e. credit to the individual account is based on each year's personal wage), as well as the social average wage (20 percent under the new unified system). The benefit was indexed to 30-80 percent of growth of local average wage in 1994 and was revised to 40-60 percent in 1997. This approach was justified on the ground that it allowed retirees to enjoy the benefits from the growth of labour productivity. It would maintain horizontal equity, thus the pensioners would not feel deprived in relation to the current workers. However, the wage indexation rather than price indexation is uncertain when the economy is unstable. As benefits depend on the pensioners' wage, if the latter fails to rise as rapidly as expected, the benefits paid to the pensioner will be less than expected. More importantly, the benefits largely depend on the social average wage in the year before retirement: if the wage in that year falls due to any *ad hoc* changes in the government's wage policy or the economic environment, the benefits will be commensurately less. For example, if the nominal wage rises by 20 percent and the overall price index by 12 percent, a 50 percent indexation to wage growth means a reduction of 2 percent in real pension. Conversely, if nominal wage grows at the same rate, and inflation increases at only 8 percent, then, a 50 percent of indexation means that real pension rises at 2 percent. In order to maintain pensioners' purchasing power, a 50 percent indexation to nominal wage requires that the nominal wage have to grow at least twice as fast as the growth rate of inflation. The author has calculated (Table 3-8) the growth rate of pensions between the year of 1982 and 1996 with 30 percent and 80 percent wage indexation. The results indicate that under the 30 percent wage indexation, the pension benefits would have had a negative rate of growth in most of those years during 1982 to 1996. The negative numbers are even higher in 1988 and 1989 when the growth rates of wages were below the rate of inflation. When pension benefits are indexed to 80 percent of nominal wage, the real pensions fall is smaller.

Table 3-8 Growth of Pension Benefits in China from 1982 to 1996
(Different percentages of indexation to nominal wages)

Year	Money wage % increase	CPI	Pension growth at 30% indexation to wage	Pension growth at 80% indexation to wage
1982	3.4	2.0	-0.98	0.72
1983	3.5	2.0	-0.95	0.80
1984	17.9	2.7	2.67	11.62
1985	17.9	11.9	-6.53	2.42
1986	15.8	7.0	-2.26	5.64
1987	9.8	8.8	-5.86	-0.96
1988	19.7	20.7	-14.79	-4.94
1989	10.8	16.3	-13.06	-7.66
1990	10.6	1.3	1.88	7.18
1991	9.3	5.1	-2.31	2.34
1992	15.9	8.6	-3.83	4.12
1993	24.3	16.1	-8.81	3.34
1994	34.6	25.0	-14.62	2.68
1995	21.2	16.8	-10.44	0.16
1996	12.9	8.8	-4.93	1.52

Source: Author's calculation. Data of wage and CPI are from *China Labour Statistics Yearbook*, 1999. CPI is urban Consumer Price Index.

Whether pension benefits should be indexed to wage or price is another issue. The key point is that, in general, retirement benefits paid through public pension schemes are price- or wage-indexed and to some extent are effectively insured against inflationary shocks. This is because public pensions are backed by the government, that has the power to tax and borrow from either domestic or foreign markets. However, private pension plans have not been effective in adjusting benefits in line with earnings or prices. In Canada, 93 percent of participants from the private sector have no formal inflation protection. In contrast, 30 percent of public-sector members benefit from full indexation, yet none does in the private sector. In Japan, only a part of the pensions replacing public social security is indexed. Indexation after retirement is a more controversial issue and has found to be far more difficult. As Bodie's survey (1990: 36) mentions, "virtually no private pension plans in the US offer automatic inflation protection after retirement". Even where regulations are permissive, benefits are rarely fully indexed. In some countries large private pensions and those with high return assets are more likely to have ad hoc pension adjustments to compensate for inflation. In the United States during the 1970s, 51 percent of all participants obtained ad hoc increases

to compensate for the decline in purchasing power whilst in the 1980s this declined to 27 percent (Ghilarducci, 1992: 138-139). Ghilarducci estimates that in the United States, pensioners who receive private pensions lost their real value between 1976 and 1986. For example, women's benefits from private pensions fell by 29 percent, whilst their social security benefits increased by 9.6 percent.

Why do private pensions fail to index payments? The answer to this is that sponsors or managers in private pension schemes are unwilling to make inflation commitments based on guesses about future price levels and fear that the cost of these adjustments may be too high. Barr (1998: 211) gives two reasons why the private market cannot supply insurance against unanticipated inflation. First, the distribution probability of different future levels of inflation is unknown. Second, there is no possibility of winners compensating losers because in the case of inflation the probability of pensioner 'A' experiencing a given rate of inflation is not independent of that for pensioner 'B' (the rate of inflation facing one pensioner will by and large face them all). Blake (1992), suggests that if real wages, and hence contributions, rise at 2-3 percent per year and fund managers can obtain real returns of 2 percent, indexation to prices should be attainable. However, according to Vittas (1992), real returns needs to exceed real earnings growth by 2-3 percent for indexation to be possible at a reasonable cost.

Prior to retirement, indexation of pensions is possible in a DB scheme because wages keep pace with general wage inflation if employees continue to work for the same employer. Davis (1995: 114) states that the move from average earnings to final salary in some countries in the 1970s can be seen as an attempt to correct for the effect of inflation. However, the indexation of pension benefits after retirement is easier in a DC scheme where fund managers or pension sponsors can seek to invest sufficient assets for indexation. Indexation of pensions is easier to achieve in a PAYG scheme than in a funded one. This is because a PAYG scheme can spread risks over a much broader population of potential contributors and beneficiaries, including workers *across* several generations, reducing the financial risks faced by covered workers. However, a funded scheme uses only financial assets to protect pensioners' benefits against price inflation.

3.2.3 The Return to Contributions

The issue of return is crucial to both individuals and society as a whole. Therefore, it is necessary to examine which type of pension scheme has the ability to deliver higher returns to contributions. This section focuses on the comparisons between publicly and privately managed funds and also between PAYG based and pre-funded plans.

(a) Public management versus private management

The investment return depends basically on two factors: the relative administrative costs and the investment performance of funds. As to returns, international evidence suggests that the rate of return on publicly administrated funded schemes has been historically low. For example, the World Bank mentions (1994, Figure 3.7) that the real rate of return on many public trust funds was negative during the 1980s. According to the Orszag and Stiglitz (1999) calculation, although "the degree of shortfall is much less pronounced...the returns earned on public pension funds during the 1980s were indeed disappointing relative to risk-free market interest rates when they are compared with market interest rates". As stated earlier, the low expected return of public pensions may result from lack of portfolio diversification - funds are required to invest in government securities or loans to failing state enterprises - and improper use of funds such as government borrowing to reduce deficit.

The case of social insurance reserves in China is one example. The present regulation requires that 80 percent of accumulated funds must be invested in government bonds and the rest kept as bank balances. Table 3-9 presents the nominal return from government bonds during the years of 1982 and 1996 and the real interest rates at the same period. It shows that the inflation-adjusted returns in 6 of the 15 years were negative. The low and even negative rate of return results in two negative effects in China. First, it seriously affects retirees who depend on their individual accounts. As the World Bank (1996: 19) concluded, although a zero rate of inflation is assumed with a contribution rate of 10 percent of wages, the replacement rates will be over 40 percent if real interest rates and growth rates of real wages are both 8 percent. However, if real wages grow at about 5 percent and real interests are 0 percent, the replacement rate will be only 10 percent (see Table 3-10). If the rate of return on the investment falls below

the rate of wage growth, workers will be disappointed with the low replacement rate they get after years of retirement saving (the shaded triangle area in Table 3-10). They may lose their confidence to join the public pension scheme, thereby threatening the future popularity of the program. Second, the pension funds are not efficiently used on a national basis. Such a low rate of return creates strong incentives for localities to avoid the regulations and invest their pension funds in various local projects with, sometimes, a much higher rate of return. However, some of these projects are wasteful or can be duplicated across the whole economy. Thus, it fails to maximise the utilisation of pension reserves on a national basis.

However, the potential differences, if any, in expected investment returns between publicly and privately managed funds may be offset by the effects of high administrative costs in privately managed pension schemes. This lowers the pension benefits in the case of DC funds and increases the cost to the sponsor for DB funds. The administrative costs arise from a variety of expenditures on fund management and regulation, which includes marketing and advertising, keeping records, determining benefit eligibility, collecting and managing the funds and so on. According to Gary Reid and Mitchell (1995), the administrative costs in USA's Social Security system are only one-quarter of those for private pension systems. This ratio is even lower in Diamond's (1977) calculation; he estimates that the USA's Social Security system spends about 2 percent of its income on administration, including sales, whilst the private insurance companies spend about 17 percent. As Boulding (1958) states: "If the cost of administering the insurance declines with every increase in the amount of insurance written, then a state monopoly will almost inevitably be cheaper than a number of competing private companies." It must be noted that employer-based private schemes have lower administrative costs than pensions based on individual contracts. This is mainly because the latter loses economies of scale in operation. Davis (1995: 130) quotes that various fees and costs account for 30 percent of contributions in the United States and 35 percent in Chile. In the United Kingdom the costs are even higher, between 40 and 45 percent of the value of individual accounts (Orszag and Stiglitz, 1999).

In conclusion, privately managed schemes may have higher expected returns than publicly managed ones but when administrative costs are taken into account, the answer

is not obvious. Further studies and more evidence from international practice are needed. Although there is evidence suggesting that the cost for DB is higher for DC[20], it is unable to conclude which one provides higher returns in general.

Table 3-9 Nominal and Real Returns of T-bond in China Between 1982 and 1996

Year	T-bond nominal interest rate (in %)	CPI	T-bond real interest rate (in %)
1982	8.0	2.0	6.0
1983	8.0	2.0	6.0
1984	8.0	2.7	5.3
1985	9.0	11.9	-2.9
1986	10.0	7.0	3.0
1987	10.0	8.8	1.2
1988	10.0	20.7	-10.7
1989	14.0	16.3	-2.3
1990	14.0	1.3	12.7
1991	10.0	5.1	4.9
1992	10.0	8.6	1.4
1993	15.2	16.1	-0.9
1994	12.2	25.0	-12.8
1995	14.3	16.8	-2.5
1996	12.0	8.8	3.2

Source: Author's calculation. Data of CPI are from *China Labour Statistics Yearbook*, the 1999 version. CPI is urban Consumer Price Index. T-bond nominal interest rates are from *The People's Bank of China Quarterly Statistical Bulletin,* 1999.

Table 3-10 Replacement Rate From a 10% Contribution Rate

Real wage growth (%)	**Real interest rates (%)**			
	0	2	5	8
	Replacement rates (%)			
0	22	40	103	225
2	16	27	65	160
5	10	16	34	78
8	7	11	21	43

Source: World Bank (1996).

Notes added by the author: It is assuming that: (1) individual works for 40 years and has 20 years of expected retirement; (2) zero rate of inflation; (3) no administrative cost; (4) real wage growth = wage growth plus age-earnings growth for the individual worker.

[20] For example, Davis (1995: 130) reports that with the same amount of assets, $1m, DB funds costs 2 percent of total assets in 1995, while DC funds cost 1.4 percent.

(b) PAYG financing versus advance funding

It is argued that a funded scheme results in more generous pensions than a PAYG scheme; some studies[21] have shown a return on pension funds exceeding the return implicit in a PAYG scheme.

Samuelson (1958) and Aaron (1966) showed that the implicit real interest rate (R) paid on contributions under a PAYG scheme should be equal to the sum of annual growth rates of the covered population ($\overline{L}$) and annual growth rate of the real average wage ($\overline{W}$) of contributors[22], that is $R = \overline{L} + \overline{W}$. In a PAYG system, if income and population are growing, workers can pay a more generous pension to current pensioners than those received by the previous generation. However, if the real rate of return (r) on savings is larger than the income and population growth rate then the pre-funded scheme has the potential to pay a more generous pension than a PAYG arrangement. Therefore, by measuring the real rate of interest r under a funded scheme and the implicit real rate of interest R under a PAYG scheme, the return on contributions under the alternative schemes can be compared. If the interest rate r is higher than the sum of the growth rate of the average wage and that of contributors ($r > \overline{L} + \overline{W}$) then funding offers higher return to individuals. If it is the other case ($r < \overline{L} + \overline{W}$) then a PAYG arrangement makes pensioners better off.

Table 3-11 shows the annual and average nominal rate of return from the public PAYG system in China between 1982 and 1996. The calculations show that during this period the average growth rate of the labour force and nominal wage was 3.9 percent and 15.2 percent respectively, giving a nominal return of 19.1 percent under the current PAYG programme. Chou (1999) suggests that the invested assets in the stock market could obtain nominal returns between 15-30 percent during the last ten years of the twentieth Century. This implies that during this period, had a funded scheme been created, it would have been more advantageous than a PAYG scheme.

[21] See the Davis' study for the US, the UK, Germany, Netherlands, Denmark and Australia (Davis, 1995), the Burtless (2000) and Leimer (1994; 1995) study for the US and the Disney and Whitehouse (1993) study for the UK.

[22] Supposing both population and wage are evenly growing, there are administrative costs and reserve funds in a PAYG scheme with benefits-in-payment adjusted according to average wage growth.

Table 3-11 Return[23] on Contributions to the State Pension in China (1982-1996)

Year	Labour force growth rate (in %)	Money wage growth rate (in%)	Nominal return from PAYG (in %)
1982	6.5	3.4	9.9
1983	3.7	3.5	7.2
1984	7.8	17.9	25.7
1985	4.5	17.9	22.4
1986	5.1	15.8	20.9
1987	5.0	9.8	14.8
1988	3.6	19.7	23.3
1989	3.1	10.8	13.9
1990	2.2	10.6	12.8
1991	1.2	9.3	10.5
1992	6.0	15.9	21.9
1993	3.0	24.3	27.3
1994	2.8	34.6	37.4
1995	2.5	21.2	23.7
1996	2.2	12.9	15.1
Average	**3.9**	**15.2**	**19.1**

Source: Author's calculation. Growth rates of labour force and money wage are from *China Labour Statistics Yearbook.*

Gong (1997) has calculated the Aaron condition under the public pension systems of four OECD countries, Germany, Sweden, the United Kingdom and the United States (see Table 3-12). He has found that there was a large decline in the growth rate of total population in the 1960s and 1970s. Although this rate rose slightly after 1979, it shows an overall decreasing trend in each of the countries from 1960 to 1994. A similar trend on the growth rates of real wages is also seen in the four countries during the period of observation. As regards the long-term interest rate, it declined in all four countries between 1960 and 1979. After that, it performed a steady increase in the United Kingdom and Sweden but decreased again after 1990 following a large increase for approximately ten years in the United States and Germany. As a result, the difference between long term interest rates and the sum of the growth rates of real wages and of population were basically negative before 1979 but positive thereafter. This calculation

[23] Since the real rate of return from stocks in China is still unavailable, the comparison is based on the nominal term.

indicates that PAYG systems provided higher returns to individuals than funded systems in the 1960s and 1970s, with the situation reversing from the 1980s.

Table 3-12 The Aaron Conditions in Observed OECD Countries (Between 1960 and 1994)

	1960-1968	1968-1973	1973-1979	1979-1990	1990-1994
	Average growth rate of population				
Germany	0.9	0.8	-0.2	0.3	0.5
Sweden	0.7	0.6	0.3	0.3	0.7
United Kingdom	0.7	0.4	< 0.05	0.2	0.4
United States	1.3	1.1	1.0	1.0	1.1
	Average growth rate of real wages				
Germany	5.1	6.4	2.6	1.5	1.5
Sweden	4.8	4.2	2.1	0.4	-0.5
United Kingdom	2.4	4.0	0.7	2.4	2.0
United States	2.2	1.3	-1.3	0.4	0.2
	Average long term real interest rates				
Germany	3.9	3.2	3.2	4.9	4.1
Sweden	1.8	1.1	-4.0	4.0	5.6
United Kingdom	2.6	1.5	-2.0	3.7	5.8
United States	2.2	0.9	-1.1	4.9	4.2
	Differences between the long term interest rates and the sum of the growth rates of population and of real wages				
Germany	-2.1	-4.0	0.8	3.1	2.1
Sweden	-3.7	-3.7	-2.8	3.3	5.4
United Kingdom	-0.5	-2.9	-2.7	1.1	3.4
United States	-1.3	-1.5	-0.8	3.5	3.0

Source: Gong, S. (1997). "Defined Contribution Pensions in a Changing World: An Evaluation of the World Bank's Pension Reform Proposals". Tables 4, 6, 7 and 12. Unpublished Paper.

3.2.4 Incentive to Save

In general, high-income workers are more likely to save in private schemes (the saving incentive is higher when given tax incentives, which is the focus of the next chapters) while low-income workers are basically dependent on public pensions. People who are relatively older and need welfare transfer from younger generations may prefer a PAYG programme, whereas young workers may prefer a funded scheme. People who have lower job mobility may favour a DB plan whilst people who have higher job mobility may consider a DC plan superior.

(a) Public schemes versus private schemes

A public pension system usually has the ability to redistribute income from the rich to the poor. It provides a safety net for those who are physically weak (sickness and invalidity) and financially weak (low-paid workers, women and the elderly). This provides some intergenerational risk sharing not found in a private scheme.

Redistribution can be made through either universal or means-tested cash benefits. In the universal approach, which pays benefits to all retirees, the benefit level is fixed on a digressive scale, i.e. a flat-rate, rather than one linked proportionally to former income or to contributions paid. The redistributive effect is even stronger with means testing. The benefit is not based on the number of years of employment and previous earnings but rather on individuals' present income. More specifically, the benefits are targeted only at those in absolute need, having no or very low incomes thus requiring the redistribution of resources across individuals and generations. Even in some countries where the employment record is the basis of benefit entitlement, crediting has been introduced for periods in which people are caring for children, elderly or disabled or other family members. One example is Germany where taking care of one's own children corresponds to previous employment of up to three years in the calculation of pensions (Ginn & Arber, 1992). Typically, it is women who undertake these caring tasks. Thus, a public pension is regarded to be more desirable than a private one in securing women's economic status. In other words, unlike private pension systems, public systems provide for social solidarity and protect against the risk of personal misfortune.[24]

There are many examples of public pension systems, particularly in industrialised countries, which have been effective in eliminating or greatly reducing poverty among

[24] However, it is worth noting that the effect of redistribution inherent in public schemes may be partially offset by differential mortality (Barr, 1998: 219). Some statistics report that people who are 'lifetime poorer' are less likely to live longer. In the United States, the mortality rate of working age persons in the lowest income group is five times that of workers in the highest income group (Pappas *et al*, 1993). In Netherlands the highest income group lives seven years longer than the lowest (Davis, 1995: 32). This means that even when a scheme is set up where redistribution is based on earnings and the pension received is flat rate, redistribution from rich to poor may in fact be relatively lower. The reason for this is that richer people tend to live longer than poorer people and thus receive a pension for a longer period of time. For example, it has been found that once differential mortality is taken into account the current state pension scheme in the UK (including SERPS) does little to alleviate lifetime income inequality (Stears, 1999). This may be largely because workers in high-paid occupations have substantially lower mortality rates than workers in low-paid occupations (Creedy, Disney and Whitehouse, 1992).

the elderly and in providing workers with an adequate degree of income replacement in old age (Barr, 1998: 218-220; Beattie and McGillivray, 1995: 6). Due to the difficulties in searching data for both public and private pension schemes on a comparative basis, Table 3-13 shows only the replacement rates of public pension programmes in a number of OECD countries. It is noticeable that the data in the table is still not completely comparable for many reasons. For example, data for some countries overstates public benefits when mandatory supplementary pensions are included. The general conclusion from the replacement rates is that public pension schemes in most countries provide replacement rates in the region of 60-80 percent. According to Schulz (1980), to maintain a living standard as that of before retirement, the elderly need a pension that is almost equal to 75 percent of former earnings. From this point of view, it can be calculated that the public pensions in all selected countries provide more than 50 percent of adequate incomes for the old. In Belgium, Denmark, France, Germany, Italy, Japan, the Netherlands, Norway and Sweden public pensions can provide adequate incomes of 80, 106.7, 104, 93.3, 80, 90.7, 93.3, 93.3 and 93.3 percent respectively for the old. That is, income maintenance in these nine countries becomes mainly the state's responsibility. The Danish and French Governments have the largest responsibility. Due to the generosity of the public system, it is reported that the old are no longer poor in comparison to children and young working adults with children in the majority of industrialised countries. According the World Bank report in 1994 (The World Bank: 78-80, Figure 3.1 and Figure 3.2), in Australia, Canada, the United States and the United Kingdom poverty rates among children are higher than those of the elderly. In France, the Netherlands, and Sweden current income is lower and poverty higher among working age adults and children than among the elderly. This means that a public old age pension programme is an effective way to reduce poverty among the old aged.

In contrast to public programmes, private pensions fail to provide for any income redistribution and intra-generational solidarity. Section 3.2.1 shows that private pensions typically favour workers who are highly paid, whilst leaving low-income workers, the poor, the elderly and women with inadequate coverage and benefit after their retirement. This feature is present in personal pension schemes in particular.

Table 3-13 Replacement Rate of Public Pension in Selected OECD Countries

Country	Replacement rate and description	Adequacy of Income (%)
Belgium	60% previous earnings for single person	80.0
Canada	40% for single person including flat rate and earnings related pension	53.3
Denmark	80% for single person including basic and supplementary pension	106.7
Finland	40-50% actual maximum for 37-42 years of coverage	53.3 - 66.7
France	78% of former income including mandated occupational pension (private sector 1993)	104.0
Germany	70% after 45 working years	93.3
Italy	60% of previous earnings	80.0
Japan	68% of covered earnings	90.7
Netherlands	70% previous earnings for single person	93.3
Norway	70% for single person including basic and supplementary pension	93.3
Sweden	70% including basic and compulsory supplementary pension	93.3
UK	40% of former earnings	53.3
US	40% of previous earnings	53.3

Source: Column 1 is selected from Kalisch, David. W. and Aman, T. (1998). "Retirement Income Systems: The Reform Process across OECD Countries", Table 3. OECD Ageing Working Paper. Replacement rate for the UK is from Pestieau (1992). Column 2 is calculated by the author.

(b) PAYG based schemes versus funded schemes

In general, the incentive to save in a funded scheme is larger for young workers than for their elder counterparts. There are two reasons. The first is that observed evidence from some OECD countries shows that earlier generations do best out of a PAYG scheme. A measure to evaluate the monetary worth from a PAYG scheme is referred to as 'the internal rate of return' by Leimer (1995). The internal rate of return measures the interest rate that individuals would have to receive on their contributions to a PAYG scheme in order to generate benefits equal to those they would receive under a private funded scheme. If the internal rate of return is larger than the interest rate available to

individuals for their own investments then they receive more than their money's worth from such a PAYG scheme. That is, they receive a higher interest rate or internal rate of return from the PAYG scheme than from their same savings in a funded scheme. Conversely, if the internal rate of return is smaller than the actual market rate that workers can earn privately then they do not get their money's worth from the PAYG programme. Table 3-15 illustrates the internal rate of return under the British social security pension scheme and American Old-Age and Survivor Insurance by measuring the average returns to each of the selected cohorts. Under the UK system, with price indexation under the present law, younger cohorts do considerably worse than older cohorts, with those in 1955 and 1960 seeing negative returns on average with continued price indexation. Even with earnings indexation, the last two cohorts would see positive returns, but only just. Also, under the OASI programme, there is a steep decline in the internal rate of return across American cohorts. The estimated internal rate of return declines from 36.5 percent for the 1876 cohort to 4.8 percent for the current retirees and declines further from 2.2 percent for the cohorts now reaching retirement age to approximately 1.9 percent for the cohorts now entering the labour market.

Table 3-15 Internal Rate of Return under the UK and the US' State Pensions
(Inflation-adjusted)

The UK state pension			The US OASI plan	
Birth cohort	Price indexed rate of return	Earnings indexed rate of return	Birth cohort	Rate of return
1935	2.4	4.0	1876	36.5
1945	0.4	1.7	1900	11.9
1955	-0.2	0.9	1925	4.8
1960	-0.3	0.8	1950	2.2
			1975	1.9

Source: Disney and Whitehouse (1993) and Leimer (1994).

Johnson, Conard and Thomson (1989) conclude that: "The workings of social security have created considerable injustices between different generations. If perceived as such, this injustice between the generations could foster discontent with future social policies and finally, undermine the 'implicit contract' between generations on which the welfare state is based." If younger generations see their return eroded relative to their parents' and their predecessors' they will see funded schemes as being more attractive.

Second, the ever improving financial markets with more financial instruments, higher competition, higher interest rates and new indexed securities will offer better portfolios with lower risks to investors. The younger generation, as they obtain more experience from security markets and become sophisticated investors, will prefer to have higher returns from the financial market, instead of putting money in PAYG pension schemes that provide them with unsatisfactory yields.

In China the financial market is constantly improving, thanks to the changes occurring in the management mode, from a planned and administrative management to that of a market-oriented system and in the investor structure, from a retail to an institutional investor-orientation. Furthermore, great changes have already taken place since 1999, with the adoption of a string of important measures. These include the lifting of the ban on financial companies from accessing stock markets and the participation of insurance and social funds as well as SOEs in the market in addition to the setting up of securities investment funds. At the same time, China has released or is about to release some regulations on the financial market, including the implementation of Securities Law, the growing internationalisation of the stock market and soon, the launch of a second board similar to the American Nasdaq. At present the listing of rules for the second board has been approved by the State Council. It is predicted that the second board will make its debut earlier next year (*Zhong Guo Zheng Quan Bao (China Securities),* December 2000). As a result, more financial instruments and higher competition from domestic as well as international markets will offer a better investment environment for funded pensions in China.

(c) DB versus DC

The question of whether a DB scheme is more attractive than a DC scheme to an individual depends on so many factors including the individual's age or number of years of service for the same employer. It also depends on the growth and stability of the macro-economy, whether the financial market performs well or badly and how the individual trades off between return and risk. In general, a DB scheme is a better choice for people who have lower job mobility. There are four important characteristics that distinguish a DB scheme from a DC scheme. First, as mentioned earlier, unlike in a DC

scheme, the individual gains higher return when the economy is booming but suffers a loss when the economy is declining; the individual's return does not reflect market returns in a DB scheme because his benefit is predetermined. It is the employer who undertakes to top up the fund to keep it in actuarial balance. Therefore, in comparison to a DC scheme, a DB scheme involves lower investment risks. Second, a DB scheme can provide employees inflation-indexed benefits before their retirement by increasing their wages in line with price inflation. Third, a DB scheme provides better insurance than a DC scheme due to stricter regulations such as minimum funding rules, premium for benefit guarantee, vesting rules, etc.. Some DB schemes also provide non-retirement income insurance such as ill-health benefits, death-in-service and survivors' benefits, which are rarely available from any DC schemes (Davis, 1995: 233). Fourth, the pension benefits are related to final salary that tends to increase with years of service. Thus, the longer the period an individual works for an employer, the higher the pension paid; consequently, should he leave employment early, he would lose his pension value.

However, people who have high job mobility may see a DC scheme as more attractive. This is because a DC scheme has three main advantages over a DB scheme. First, the function of individual account has higher labour flexibility. Workers do not have to transfer their retirement accounts into other retirement saving vehicles when changing jobs. They can quickly transfer to growing industries or areas away from twilight ones. Second, the contribution rate is clearly defined, thus the relationship between the fund's earnings and expected benefits is plain to see. Therefore, a savings account balance is easier to understand, as workers know exactly how much is in their individual savings account. Third, as future benefits are determined by investment returns, individual savers have higher incentive to participate in portfolio management such as choosing between assets such as stocks, mutual funds, local or government bonds, industrial securities and other financial instruments.

3.3 The Impact of Funded Private Pensions on Economic Development and Growth

This section focuses on two macro-economic issues of pension reform that attract much debates: the role of advance funding in generating long-term capitals and increasing national saving and in stimulating the development of financial markets.

3.3.1 Funding and Long-term Capital Resources

The question of whether funded pensions increase savings at national level is unclear. In the United States, for example, "the extent to which that private pensions have created new savings by US households has become polarised. At one end of the spectrum the work of Poterba, Venti and Wise has suggested that funds in the schemes have come almost entirely from new saving. At the other end of the scale, Engen, Gale and Sholtz claim that new saving accounts for almost nothing and that all funds were coming from the reshuffling of the assets of the previously wealthy" (Banks, 1996). In China the potential effect of private pension funds on national saving has not received much attention from the government or economists. This is because China is one of those countries that have a substantially high savings rate. The ratio of private savings to GDP was between 35 to 40 percent in 2000. The question of how to direct a portion of savings flow from other financial assets to private pension assets is the concern of this thesis. As Davis (1995: 15-16) puts it "pension funds may have a minor effect on total saving, but their crucial effect on the capital markets may be indirect effects in changing the composition of saving towards long-term financial saving."

China has enormous needs for infrastructure and other long-term investments. The present pension system in China, which is mainly operated on a PAYG basis, does not contribute to this purpose. By the end of 1997, the reserved pension funds were only about 78.45bn Yuan, which accounted for 0.11 percent of China's GDP of that year. On the other hand, the World Bank in 1995 projected the demand for infrastructure investment for 1995-2004 to be as high as $744bn or 7.4 percent of GDP. Although the rate of saving accounts are 35-40 percent of GDP, because long-term saving instruments are not available, most household savings are in short- and medium-term deposits,

which do not provide a good match for long-term lending. The lack of reliable long-term financial instruments means that infrastructure investments have to rely on foreign financial resources that may require higher interest rates.

Funded pension funds can provide enormous long-term capital funds, thus efficiently allocating domestic resources. This is because pension funds have three peculiar characteristics: first, inflows and outflows of funds are rather stable and predictable; second, liabilities are non-tradable, which means that they have lower withdrawal risks, and third, the return on investment can be maximised with a long-term perspective (Franco, 1996).[25] These features imply that in pension funds the portfolio share of liquid assets can be small, while that of long-term bonds and equities can be relatively high. The high demand for bonds and equities by pension funds exerts positive effects on investment and economic growth, providing more risk-capital to firms and reducing long-term interest rates. Therefore, channelling savings into pension funds may be beneficial to growing enterprises and long-term investments in China. As Davis (1993) argues, this "is seen as beneficial in providing risk capital for growing enterprises, as well as offsetting the potential fragility and/or dependence on bank finance which stems from high debt/equity ratios".

The experience from Southeast Asia and Latin American countries shows that funded pension schemes contribute to rapid accumulations of long-term financial resources. Vittas (1996) reports that the resources of the Central Provident Fund in Singapore rose from 28 percent of GDP in 1976 to 73 percent in 1986 and 76 percent in 1990. In Malaysia provident fund assets grew from 18 percent of GDP in 1980 to 41 percent in 1990. In Chile pension funds increased from 1 percent of GDP in 1981 to 9 percent in 1985, 26 percent in 1990. In both the United Kingdom and the United States pension funds, $750bn and $6,000bn respectively, own over 30 percent of their stock market values and are equivalent to about 60 percent of their GDP. Some other OECD countries also have experienced a pronounced development in pension funds for decades. For example, in Switzerland, the Netherlands, Ireland and Japan pension fund assets as a share of GDP, reached 117 percent, 87 percent, 45 percent and 42 percent respectively by the end of 1996 (OECD 1998). In industrialised countries pension funds have already

[25] Also see Blake, 1995.

become an important mechanism for capital accumulation. As Minns (1996) observes, by the end of 1993, the investment assets (stocks, shares, bonds, cash and property) of funded pension schemes throughout the world had amounted to around $10,000bn. This figure is larger than the combined total market value of the entire world's industrial, commercial and financial corporations quoted on the three largest world stock markets, those of the United Kingdom, the United States and Japan.

However, it must be pointed out that the extent to which a move from the current PAYG public system to a funded private system would provoke response by Chinese individuals may be influenced by the following factors: A: whether pension saving is compulsory or voluntary – mandating saving can overcome the problem of myopia and moral hazard, thus increasing savings by those who do not save or do not save enough; B: whether pension benefits from public programme are so high that there is no need (or income resources) for individuals to save more; C: whether pension funds are provided with tax incentives - preferential tax treatments on pension funds may encourage taxpayers to save more. These three issues will be dealt with in the remaining chapters, although other factors such as the rate of unemployment, rate of growth of wages, demographic trend and individuals' choice between current and future consumption also affect individuals' saving decisions. For instance, Schieber and Shoven (1994) point out that the ever-increasing dependency ratio in the United States will make private saving fall. According to their estimation, private pension assets in the United States will reach their peak in 2030 and fall sharply thereafter.

3.3.2 Funding and Financial Market

Fennell and Zhu (1996) claim that setting up a privatised pension system is possible in China. Likening a private funded pension to a boat and a developed financial market to water, they argue that "like a boat which is useless without water, private pension funds can not run well without an open and functioning financial market". However, Vittas (1996; 1999) suggests that private pension funds are not only a source of long-term savings for supporting the development of bond and equity markets. They are likely to have a beneficial impact on financial market development once they reach massive size: they have a positive force for innovation, for corporate governance and for financial

market modernisation. Therefore, pension reform need not be delayed until capital markets are well established. The positive impact of private pension funds on financial markets is evident in some countries that have implemented systemic pension reforms. For example, in Argentina financial innovation has been promoted by the newly created private pension funds. Chile has seen many developments and improvements in the financial sector after the introduction of their new pension system. The financial market has become more fluid as the number of traded shares on the stock market and their turnovers have increased. Information disclosure and credit rating institutions have developed. Varieties of financial instruments including indexed annuities, mortgages and corporate bonds have grown and asset pricing has improved (Diamond and Valdes-Prieto, 1994: James, 2000). International experience proves that the development of pension funds can contribute to at least the following three qualitative developments in financial markets:

The first positive effect of pension funds (and other institutional investors) is their advantages over corporate governance. Although pension funds have been accused of "short-termism" and disrupting the market[26] in, for example, the United States (Ghilarducci, 1994) and the United Kingdom (Davis, 1993), their character of collective management may be superior to individual management. There are three reasons. First, the former has the economies of scale in transaction costs in collecting and managing information, as well as risk pooling. Second, the institutionalisation of asset management may also produce positive effects on corporate governance. Unlike individual investors who are passive participants in corporate governance because they lack the power or knowledge to delve into the analysis of reports and accounts, institutional shareholders can put pressure on firms to focus on return on equity and provide more and better quality information to shareholders. This is because they are rich in funds and have potential power to exert substantial influence on firms' management (Charkham, 1994). Third, institutional shareholders can better monitor the performance of firms and be more effective in replacing persistently poorly performing

[26] With the growth of asset accumulation, pension funds will become the dominant shareholders of companies. If they are not happy with corporate performance and exercise the exit option, market share price will suffer a big fall.

companies.[27] Franco (1996: 12) concludes that "there might be a reason to provide incentives (to build up pension funds) where the financial markets are rather underdeveloped and there is a need to accelerate the development of institutional investors".

The second positive effect is that the development of pension funds and other institutions increases demands for futures and options in response to price volatility in financial markets (Bodie, 1990). The need by pension funds for hedging against shortfalls of assets relative to liabilities has encouraged the development of 'securitisation' and stimulated the modernisation of capital markets.

Finally, the development of pension funds and other institutions is likely to promote competition and efficiency in the financial system. In a bank-based financial system, borrowing through commercial banks is the traditional way for companies to finance their business. However, security markets develop, companies can access funds through non-bank financial intermediaries or directly borrow from security markets. This will force all bank and non-bank financial intermediaries to become more competitive. The well-developed financial system with high competitions will in turn offer investors the opportunity for better portfolio returns and risk management.

As Vittas argues (1999), the stability of the overall economy, low level of inflation and effective regulatory and supervisory agencies will determine whether pension funds can operate efficiently. This precondition is important, especially for developing countries with weak regulatory structures. Also, the development of private pensions requires sound, prudent and efficient financial institutions, such as banks and insurance companies, to conduct and manage pension contributions and funds. However, it does not depend on the prior existence of well-developed security markets.

[27] One of the examples is the British company, The Body Shop. See *Financial Times*, 10 April 1996 and 13 May 1998.

3.4 Conclusion

This chapter compared different pension schemes with particular reference to risk, return and incentives to save. It has also addressed the positive effect of funded pensions on the Chinese economy and the financial markets.

Public pensions are widely seen as an effective means of income redistribution among pensioners, especially through their ability to transfer welfare from rich to poor. They can provide generational solidarity through the indexation of pensions to wages. They are more efficient in providing insurance against inflation risks. Public pensions therefore have the economic benefit of correcting market failure whilst the private sector is unable alone to alleviate poverty and to promote social welfare, stability and solidarity. Due to the above advantages, public pensions are seen to be more important than private pensions by people who do not save or do not save enough in private pension schemes because they are low-income earners, short-term workers or physically weak. However, public pensions are more vulnerable to political risks. Also, the investment of reserves, if any, is more likely to be influenced by political decisions rather than returns. On the other hand, privately managed schemes are less likely to suffer from political risks. They give individuals more freedom to decide on where and how much to save and sometimes, their portfolio management. More importantly, they provide people, especially high-income earners, with enough financial resources to maintain their standard of living after retirement. However, they are not superior to public pensions in terms of protecting investors against financial risks, including investment risks and inflation risks. Moreover, world-wide they have shown to have low coverage and a non-redistributive nature, failing to transfer income from the rich to the poor. With regards the issue of returns, there is no clear answer to the question of whether public or private schemes generate higher returns after adjustment for administrative costs. International evidence suggests that privately managed pensions, especially individual pension contracts, have much higher administrative costs than publicly managed ones.

In relation to DB and DC schemes, for the former, benefits paid to pensioners are, in general, predetermined whilst for the latter, the pensions' benefits are dependent on

returns on assets invested. Therefore, the investment risk is much higher in DC schemes than in DB schemes. As regards inflationary risk, indexation of pension benefits is easier in DB schemes before individuals' retirement. However it is easier in DC schemes after. Although individuals' decisions on which type of scheme to save depend on many factors such as age, consecutive years of service for the same employer, financial market conditions, and attitudes towards risk and return, this chapter suggests that DB schemes benefit those who are less likely to change jobs, while DC schemes are a better choice for those who expect to change jobs frequently during their working lives.

PAYG programmes have financial advantages while the population is growing and, in particular, while the number of active workers making contributions is growing more quickly than the number of pensioners for whom they must provide retirement benefits. However, it is because of this nature that PAYG programmes are financially vulnerable to increasing dependency ratio, high unemployment rate and low economic growth, which often lead to reductions in benefits. Funded programmes, however, can avoid those risks but are more likely to suffer from risks associated with investment and price inflation. Funded pension schemes are more attractive than PAYG schemes to young workers due to the following two reasons. Individuals see contributions in PAYG schemes as taxes because the link between contributions and benefits is not clear, that is, contributions paid are not closely related to the pension that is eventually received. In contrast, people in funded schemes are less likely to regard their contributions as taxes because there is a closer relationship between contributions made and the pension that is subsequently paid. Therefore, a close relationship between contribution and benefit in funded schemes reduces saving disincentives, especially to younger generations. Funded schemes are also seen to be able to generate higher rates of return to contributions than PAYG schemes in an era when population growth is slowing down while financial markets are improving. However, a move from PAYG to funded systems may not necessarily increase the rate of return to individual workers. This is because such a move could substantially redistribute the resources away from the transition workers who pay twice - that is to save for their own retirement and to pay for current pensioners. Also, the increased rate of return from the extra funding may be offset by the cost of financing the transition cost. Orszag and Stiglitz (1999) point out that if the

transition cost is financed by borrowing rather than raising taxes, the interest paid for the debt will exactly offset the increased return to the individual accounts. In this case, a move toward a pre-funded system may not generate a higher rate of return to future generations than a PAYG system. However, funded pensions have positive effects on the broader economy. They can accumulate long-term savings and also contribute to developments and formation of financial markets.

In light of the discussion in this chapter a mixed system is considered to be best for both individuals and the economy – as is recognised by the Chinese government. The next two chapters move on to the question of how to promote in China through taxation a private pension system, including occupational pensions and personal saving plans. The costs of tax incentives to private pensions are estimated in Chapter 6.

IV. HOW SHOULD PRIVATE PENSIONS BE TAXED?

4.1 Introduction

As mentioned in the previous chapter, within this first decade of the twenty-first Century China has to set up a pension system with 'three tiers', i.e. a state pension, an enterprise supplementary pension and a personal (individual) pension. According to the government, the private pension, which includes the enterprise supplementary pension scheme and the individual's saving plan, must become an important component of the entire Chinese pension system as the state pension provides pensioners with benefits for only basic living. Although the government has been encouraging both enterprises and individuals to set up private pension schemes since as early as the beginning of the 1990s, there has not been much response. In contrast to many industrialised countries where private pensions are playing an increasingly important role in providing retirement incomes for the elderly, the state pension in China still dominates the pension mix. As addressed in the introductory chapter, many reasons could account for the fast and high development of private pensions in the majority of industrialised countries, such as the relatively low level of public benefits, well-developed financial markets and compulsory retirement saving schemes, to mention but a few. This chapter, however, examines the way in which most OECD countries promote private pensions through taxation.

Chapter Four is structured as follows: the second section studies the general pattern of taxation on private pensions in 20 OECD countries and analyses the paramount importance of tax incentives to the development of private pensions. The consequence of the cut back on tax benefits in New Zealand is also addressed. The third section discusses the taxation of return on savings on both equity and efficiency grounds. Two fundamental tax systems are compared - the Expenditure Tax system and the Income Tax system - focusing on the issue of whether people should be taxed on income or consumption. In the following section is addressed the question of whether private pensions (savings for retirement) should be taxed differently from savings in general. The fifth section discusses the taxation of lump sums and is followed by the conclusion.

4.2 Tax Experience in OECD Nations

4.2.1 Taxation of Private Pensions in OECD Countries

Andrew Dilnot (1992) suggests that funded private pensions can be taxed at three points of their activity: when contributions are paid into the fund from employer or employee; when income is earned from the investment of contributions by the fund and when retirement benefits are paid from the accumulated fund. Each of these three basic transactions can be the object of tax treatment. Dilnot has developed a useful shorthand describing the pattern of tax treatments based on each transaction being taxed (T) or exempted (E) from taxation. According to this taxonomy, the fiscal treatments of private pensions in 20 OECD countries are summarised in Table 5-1. It shows that the general feature of the tax treatment in the countries studied can be classified into three main regimes. The first regime is "TTT" in which taxes are levied on all three points of activity - pension contribution, fund accumulation and benefit distribution. Of all the OECD countries observed, Australia is the only country that collects revenues from all three transactions.[28] It must be noted here that the tax treatment of private pensions in China follows the regime mentioned above. In the second regime, returns to pension funds are taxed and either contributions or pension payments also are taxed. This tax regime can be characterised as "ETT" or "TTE". Nations following this pattern include New Zealand, Denmark, Sweden, Japan and Belgium (for self-administered funds). The third regime may be simplified as "EET" or "TEE", in which either contributions or pension benefits are taxed while fund incomes are not. It can be seen from the table that this is the most common regime of the OECD countries studied including Finland, France, Germany, Iceland, Ireland, Italy, Luxembourg, Norway, Portugal, the United Kingdom and the United States. However, as noted by Dilnot (1993: 6), the shorthand "is inevitably a heroic simplification". One of the remarkable reasons is that in some countries where private pensions are taxed, they tend to be taxed more lightly than ordinary labour income (when contributions and benefits are compared) and other capital income (when fund returns are concerned). Therefore, the shorthand "E" or "T" may overstate the degree of taxation in many cases. In table 4-1 "t" (lower case) is used

[28] Regime TTT is also operated in Russia for some pension schemes (Vittas, 19980).

to describe the more generous tax treatments (lower tax rates) of private pensions than that of other incomes from labour or capital. Therefore, "t" indicates that either contributions to and benefits from pension funds (schemes) are taxed at rates lower than marginal income tax rates or funds' investment incomes are more lightly taxed than other forms of saving. Although the simplified regime based on the taxation pattern (T or t) and tax exemption (E) can give a general profile of private pension taxation in the OECD countries, it is still not possible to interpret the complexity of tax regimes in practice. The complexity mainly results from the following four elements: a) enormous variations of funding arrangements, e.g. pay-as-you-go or funded, b) limits on contributions that can be made while enjoying tax deductibility, c) limits on benefits from pension funds and d) different treatments of lump sum payments, e.g. taxed the same way as annuities or more generously treated. It is because of the above reasons that we turn to a more detailed descriptive analysis of the taxation of pensions in the following OECD countries.[29]

In ***Australia*** employee contributions are not deductible but a 10 percent rebate applies to the first A$1,000 of contributions by employees, subject to an income test. This test phases out rebatable contributions by 25 cents for each dollar of income over A$27,000. Investment income of the fund is taxed at 15 percent. Capital gains are taxed at the same rate after adjustment for inflation. Most pension benefits are included in the recipient's assessable income and taxed at the individual's marginal rate but a 15 percent rebate is available in respect of pensions paid from taxed funds. Lump sum benefits from a fund after age 55 are taxed at the rates of zero for the first A$90,474 and 15 percent for amounts in excess of this threshold. Therefore, there remains a degree of fiscal privilege as the tax rates on labour income (marginal tax rate is 47% for top income earners) and other forms of saving (interests and dividends are received as gross and taxed as ordinary income) exceed these levels. Thus, the Australian tax regime may be characterised as ttt rather than TTT.

In ***Austria***, 25 percent of employee contributions to pension funds are deductible with a ceiling of the deduction of Sch10,000 for incomes below Sch700,000. Pension benefits

[29] The descriptive analysis is based on three main references. They are Dilnot, A. and Johnson, P. (1993), *The Taxation of Private Pensions;* Davis, E. P. (1995), *Pension Funds: Retirement-income Security and*

are taxed as labour income but only 25 percent of the employee's contribution is taken into the tax base. Returns to funds are not taxed. The tax pattern thus characterises TEE or EET.

In ***Belgium*** there are two different ways of funding a pension scheme - through group insurance contracts or self-administered funds - and they are taxed separately and differently. Employee contributions to self-administered funds are tax-exempt up to a limit. There is a tax on all returns to liquid assets at a rate of 10 percent on interest income and 20 or 25 percent on dividends and income from property, as applied to investments by other individuals and organisations. In addition there is a 0.17 percent on the total fund. Premiums paid from employees to group insurance contracts are subject to a special 4.4 percent tax, however, the returns are in general not subject to tax, although there is a special tax on returns above the insured minimum needed to cover benefit liabilities. This tax is levied at a rate of 9.25 percent with 50 percent deductible against profits taxes. Retirement benefits paid from both funds and group insurance contracts are taxed as earned income if paid as pensions. However, 80 percent of retirement benefits can be paid as lump sums which are taxed at a reduced rate of 16.5 percent. Lump sums paid from self-administered funds are fully taxed whilst only three quarters of total payment are subject to this tax, the rest are taxed at 9.25 percent. Therefore, the taxation on the Belgium supplementary pensions can be simplified as tET regime (for group insurance contracts) and ETT regime (for self-administered funds). If the tax treatment of lump sums is considered, the regimes can be described as tEt and ETt respectively.

In ***Canada***, which follows the EET approach, contributions to all types of pension funds, 18 percent of earned income, are tax deductible subject to a maximum of C$15,000. Fund incomes are also tax-free. Pension benefits are taxed as ordinary income while lump sums are forbidden.

The tax pattern of private pensions in ***Denmark*** has followed the ETT model since 1984. Both employer and employee contributions to supplementary pension schemes are fully deductible for tax purposes, though for capital schemes only up to a combined

Capital Markets; and OECD (2000), *Tax Database*.

limit of DKr28,400 per year. Since 1984, investment incomes of pension funds are taxed if the interest exceeds 3.5 percent of real returns, including realised and unrealised capital gains. The tax rate varies year-by-year and is calculated annually; for example, it was 44 percent in 1990, 40 percent in 1991, 50 percent in 1993 and 26 percent in 2000. Pension payments from supplementary pensions are taxed as earned income while lump-sum retirement benefits are taxed separately at a flat rate of 40%.

The taxation in ***Finland*** also follows the EET regime. Contributions paid for voluntary pension insurance of the tax payer and his/her spouse up to Fmk50,000 are deductible for both state and municipal tax. However, the amount deductible is subject to certain restrictions concerning, for example, the level of forthcoming pension insurance benefit. Investment income is free of tax whilst benefits are subject to income tax.

France is another example of the EET tax treatment of pension. The compulsory PAYG supplementary private pension schemes are conceded relatively favourable tax treatment. Tax exempted contributions to collective pension plan earn points for employees. At retirement the points thereby accumulated determine the pension which the employee will receive; benefits are paid out of contemporaneous contributions and hence there is no funding of future liabilities. Both employer and employee contributions are tax deductible up to certain limits above which employer contributions are treated as salary. Pension benefits are taxed as income after allowances similar to those applied to ordinary income. There are no assets to pay as lump sums benefits. Funded pension plans enjoy similar treatment while book reserves are fiscally discouraged.

The taxation of private pensions in ***Germany*** depends on the method of funding occupational pensions. The main type of method is through the use of "book reserve" accounting which has no special fund. A company establishing a pension plan and promising benefits sets up a reserve in its books and can claim a tax deduction each year for allocation to that reserve. Prospective pension liabilities are charged each year against the company's profit and loss account and balance sheet. Charges computed in accordance with bases agreed by the tax authorities can be deducted in assessing corporation tax liabilities. Scheme members rank with other creditors in the event of

insolvency of the parent company; hence legislation requires that benefits and pensions in payment should be insured through membership of the solvency insurance scheme, *"Pensionsicherungsverein"*. For the book reserve type of pension there is no tax charge to employees until pensions are paid. So, a book reserve type of supplementary pensions follows the common EET pattern of taxation. For the direct insurance funds and provident funds, the taxation is rather different. Contributions are considered as taxable income while pension benefits are taxed very lightly if paid as a pension (only interest earned after pension payments have begun is subject to tax) and not at all if paid as a lump sum. Generally speaking, direct insurance and provident pension funds are subject to TEE type of tax regime. However, book-reserved funds and support funds account for more than 60 percent of pension liabilities.

Ireland has a well-developed private pension system as in other English-speaking countries such as the United Kingdom and the United States. Contributions from both employers and employees are fully tax-deductible up to a maximum of 15 percent of annual salary. Fund incomes are free of taxes and pension benefits are taxed as ordinary income. Therefore the system is the EET regime. However, lump sum payments made under approved superannuation schemes are not taxable up to 1.5 times of final salary. This treatment does not apply to other forms of saving. Thus, the realistic tax system may be an EEt.

Supplementary private pensions in ***Italy*** are minimal due to the existing generous public pension programmes. The current small number of funded schemes is taxed very similar to regime EET or EEt. Employer contributions are tax deductible if satisfying certain conditions such as being a collective agreement and being run by a clearly defined separate legal entity. Employee contributions are limited up to L2.5mn. Benefits are taxed as ordinary income while lump sums are more lightly taxed.

In ***Japan***, employee contributions into Employees' Pension Funds (introduced in 1966 for large firms with 500 or more employees who can contract out of earnings related social security) can be fully deductible from their income. Employees' contributions for Qualified Retirement Pension Funds (introduced in 1962 and available to small firms) are deductible from income up to a ceiling of Y50,000. A rate of 1.127 percent special

tax is levied on the proportion of the stock of assets of the fund contributions by the employer. There is a tax-free allowance for Employees' Pension Funds but not for Qualified Retirement Pension Funds. Lump sums are more lightly taxed than annuities. Thus the tax regime basically follows the regime of EtT or Ett.

The tax system in ***Luxembourg*** is close to the TEE regime. Employee contributions to supplementary private pension schemes are deductible up to an annual ceiling of LUF48,000. However, these contributions are taxed by a withholding tax of 25 percent paid by the employer. The pension annuity and lump sums paid under the pension scheme are exempted of income tax. However, contributions to voluntary pension insurance are deductible up to an annual ceiling of LUF48,000. Pension annuities are taxed as ordinary income. The tax regime is accordingly EET.

In ***New Zealand***, the reform in the late 1980s and the early 1990s brings the tax regime from EET to TTE. Neither employee nor employer contributions are deductible but pension benefits are exempted from income taxes. Investment incomes on funds are currently treated as all other forms of saving, taxed at 33 percent.

The tax system of private pension schemes in ***Norway*** characterises the EET regime. Contributions to individual pension agreement schemes (IPA) are deductible up to a maximum amount of NOK40,000. Premiums and contributions to occupational pension schemes in the private and public sector are unlimited. Investment returns are not taxable while benefits are subject to income tax.

The ***Spanish*** supplementary pension schemes are currently taxed under the EET type of treatment, subject to some conditions. Under the current law contributions to funds are not taxed if funds satisfy some criteria including immediate vesting, full external funding, non-discriminatory coverage of all employees and a high degree of workers' participation. For example, unfunded liabilities of PAYG and book reserve schemes, which do not comply with the conditions, are not deductible for tax purposes. Fund returns are not subject to tax while benefits are taxed as ordinary income.

Until 1991, pensions in ***Sweden*** were taxed under a regime very close to EET. The 1991 reform entails all annual earnings on private pension funds subject to tax in order to improve equity with other forms of saving though contributions to pensions remain tax-exempt. The tax rate is 10 percent for the compulsory pension schemes ITP and STP and 15 percent for foreign insurance and individual insurance contracts. However, it must be noted that returns on other forms of saving are taxed at 30 percent in Sweden. Therefore, the Swedish tax regime of supplementary pension funds is EtT rather than the standardised ETT.

In ***Turkey***, private pensions are fiscally privileged. According to the OECD surveys (OECD, 1994; 2000), there was no tax imposed on Turkish private pension schemes. Employee contributions were fully deductible from the wage income.[30] Employer contributions were considered to be part of the employee's wage income and were fully deductible from the business profits of the employer. Interests accruing in pension funds were exempt from tax.[31] Annuities and lump sums made by private pension schemes were exempt from personal income tax. This means that private pensions were treated under the EEE model.[32] However, in Turkey other savings instruments were also lightly taxed. For example, bank interests were subject to withholding tax at 10.5 percent. This tax rate was lower than the top marginal income tax rate of 40 percent. Moreover, although investing in government bonds and treasury bills was subject to withholding tax the rate however applied to assets was 0 percent. In addition, saving through life insurance companies was treated similar to private pensions. Employee contributions were deductible[33] and annuities were tax-free.

The United Kingdom follows the EET or the EEt regime. As noted in Chapter 4, under the current law pension contributions to "tax-approved" personal or occupational pension plans are tax-free up to certain ceiling. Income generated by pension funds from the accumulation of the returns on assets is also exempt from tax. When a pension is paid it is treated as earned income and taxed accordingly. Part of an individual's pension

[30] With ceilings.

[31] Subject to some restrictions.

[32] Apart from Turkey, Singapore and Malaysia also implement the EEE regime with no taxes on any pension transactions (The World Bank, 1994: 215).

rights, equivalent to 25 percent of accumulated value, can be paid out as a tax-free lump sum. However, non-approved schemes are taxed separately. There are no limits on contributions, but no tax relief is given for non-approved schemes. An employer can obtain a deduction from profits only if the employee is taxed on their own contributions. All income of non-approved schemes derived from holding investments will be taxable in the hands of the scheme managers at the basic rate only. Pensions and annuities are taxable at the scheme member's marginal tax rate. Lump-sum benefits are tax exempted. Attention must be paid to the fact that all benefits (including lump-sum payments) from non-approved unfunded occupational schemes are liable for income tax.

In ***the United States***, tax privileged 'qualified retirement plans' are defined by the Internal Revenue Code of 1954 and the Employee Retirement Income Security Act of 1974 (ERISA). Employer contributions are tax-deductible up to certain limits and income on investments is deferred until the pension is paid out. The overall tax advantages to pension savings have led to enormous growth in pension funds. Since employee contributions are not tax-exempt, there are very few contributions made from employees. Therefore the actual tax pattern of employer pension in the United States may be an EET regime rather than a TET regime. However, employee contributions to personal pensions, i.e. the Individual Retirement Accounts (IRAs) in the States, are deterred until pensions are paid at retirement. There is no tax levied on accumulated funds. Thus IRAs follows the EET regime.

Following these general description four important points must be addressed. First, most OECD countries have tax deduction for pension contributions from both employers and employees. Only a few countries impose taxes on employee contributions although employer contributions are tax-deductible up to a ceiling. In countries where employee contributions are deductible, deduction is always subject to limits or conditions in order to prevent abuse by high-income earners. At present the tax arrangement of enterprises supplementary pensions in China discriminates against employee contributions. Employer contributions made on behalf of employees may be deductible, but employee contributions are not in general deductible. A sensible policy change would be the introduction of employee contribution deductibility, in which case it would not matter

[33] Also subject to some limits.

whether contribution were from the employer or the employee as they would receive the same tax treatment. Such an arrangement would also serve to encourage higher employee contributions and thus improve compliance rates.

The second point is the tax treatment of unfunded pension plans. In Japan contributions to unfunded schemes are only partly deductible while in the United Kingdom unfunded schemes would not gain any tax privileges. Book reserves and PAYG plans were outlawed in Belgium in 1985 and in Spain in 1987. Only few countries such as France (PAYG) and Germany (book reserves) support unfunded pension schemes by tax privileges similar to that of English-speaking countries with employer and employee contributions and investment incomes exempt. An unfunded pension scheme based on either a PAYG system or book reserve accounting has at least three disadvantages. First, there is a lack of employee protection in the event of bankruptcy; second, it exacerbates the difficulty of portability of pensions from one employer to another (in a DB scheme in particular); last, but not least, it does not contribute to long-term capital accumulations. The issue of whether unfunded plans should be tax-supported must be carefully considered.

Third, most countries exempt investment income from income tax. Only six countries studied subject to tax any investment income; they are Australia, Sweden, Denmark, Japan, Belgium and New Zealand. However, in the first three countries, at least, the taxation arrangements are in fact considerably more generous than other forms of saving. As noted in the case of Australia, returns on pension funds are taxed at 15 percent whilst returns on other forms of saving are taxed as ordinary income on which the tax rate can reach as high as 47 percent for top income earners. In Sweden the tax is levied at just 10 to 15 percent against 30 percent on other forms of capital income. In Denmark the tax rate is 26 percent for fund returns, while it could be as high as 57 percent for income from bank deposits and government bonds (dividends are taxed at 25%). Obviously this tax system most benefits taxpayers at the highest income-tax bracket. It is worth noting that in Australia investment income is taxed after being adjusted for inflation. In Denmark this takes the form of upper limits on real rates of return (i.e. any investment income in excess of a specified limit of real returns is liable

to tax). The question of whether to tax investment income of private pensions is discussed in Section 4.4 of this chapter.

Fourth, lump sum payments from pension schemes are taxed more lightly in one third of the OECD countries studied, among which United Kingdom and Ireland allow tax-free lump sums of about 1.5 times the final salary. However, most countries treat lump-sum payments in the same way as pension annuities. Noticeably, in Canada and France lump sum payments from tax-privileged pension regimes are not allowed. In many OECD countries lump sum payments are an increasingly common cause of diminishing pension funds and payments as they are used by individuals for home purchases, medical, educational and holiday expenses. So how should lump sums be taxed? Should they enjoy more generous tax treatment than pension annuities or be taxed more heavily to ensure that the retirement income stream lasts throughout the life span of the beneficiary? Policy issues concerning the tax treatment of lump sums are discussed in Section 4.5.

Table 4-1 Fiscal Treatment of Private Pensions in some OECD Countries

	Employee contributions [a]	Fund returns	Benefits		Simplified tax regime	
			Pensions	*Lump sum* [b]	*Excluding Lump sum*	*Including Lump sum*
Australia	Taxed at low rate	Taxed at 15%	Taxed at low rate	More generous	ttt	ttt
Austria	25% deductible	Exempt	25% taxed	As annuities	EET(TEE)	EET(TEE)
Belgium	Exempt/Taxed	Taxed/ Exempt	Taxed	More generous	ETT/ tET	ETt/ tEt
Canada	Deductible	Exempt	Taxed	Not permitted	EET	EET
Denmark	Deductible	Taxed at 26%	Taxed	Taxed at 40%	EtT	-
Finland	Deductible	Exempt	Taxed	As annuities	EET	EET
France	Deductible	Exempt	Taxed	Not permitted	EET	EET
Germany	Deductible/Taxed	Exempt	Taxed/ Lightly taxed	As annuities	EET/ TEt	EET/ TEE
Ireland	Deductible	Exempt	Taxed	1.5 times of final salary tax free	EET	EEt
Italy	Deductible	Exempt	Taxed	More generous	EET	EEt
Japan	Deductible	Taxed at 1.127%	Taxed	More generous	EtT	Ett
Luxembourg	Deductible/Taxed	Exempt	Exempt/ Taxed	- As annuities	TEE/ EET	- EET
New Zealand	Taxed	Taxed at 33%	Exempt	-	TTE	-
Norway	Deductible	Exempt	Taxed	As annuities	EET	EET
Portugal	Deductible	Exempt	Taxed	More generous	EET	EEt
Spain	Deductible	Exempt	Taxed	As annuities	EET	EET
Sweden	Deductible	Taxed at 10 or 15%	Taxed	As annuities	EtT	EtT
Turkey	Deductible	Exempt	Exempt	-	EEE	-
U.K	Deductible	Exempt	Taxed	25% total values tax free	EET	EEt
U.S	Deductible/Taxed	Exempt	Taxed	As annuities	TET/ EET	TET EET

Source: (1) OECD (2000: 14; 60-66) *The OECD Tax Database.*
(2) Dilnot, A. and Johnson, P. (1993: 7-16) *The Taxation of Private Pension.*
(3) Davis, E. P. (1995: 88-88) *Pension Funds: Retirement-income Security and Capital Markets.*

(a) In most countries, employer contributions are deductible up to certain ceilings. This table summarises the tax status of contributions from employees to private pensions only.

(b) Compared to pension benefits.

4.2.2 Tax Incentives and Pension Development

A considerable body of empirical work has proved the significant effect of personal income tax on the individual's portfolio composition. Studies by Feldstein (1976) and Hubbard (1985) for the US, Dick-Mireaux and King (1983) for Canada, King and Leape (1984) for the UK, and Agell and Edin (1990) for Sweden have unexceptionally found strong effects of tax on the decisions of households as to what assets to hold. Tax privileges afforded pension funds make them an attractive means of saving for workers and have thus inspired their development in OECD countries. In assessing public policies underlying the expansion of pensions in the United States, Ippolito (1986: 16) points out that the US pension asset is not subject to a natural rate of growth. Its development and even its existence depend on an underlying demand for pensions by workers and enterprises, heavily influenced by the tax advantages afforded those pensions. He estimates that for workers earning the median wage, 20 percent of pension income during retirement would otherwise be taken in higher taxes if preferential tax status were not afforded to pension plans. For workers earning more than the median wage, the tax benefit could amount to 40 percent of their retirement income. According to him, the tax theory of pension fund growth would be quite a powerful predictor of their development. More specifically, pension coverage would be greatest for those facing the highest tax rates, as would pension fund growth which would be greatest when tax rates are highest. A regression analysis conducted by Davis (1995: 58) has found that a deviation from favourable tax treatment of pensions (i.e. EET or TEE) is related to a 21 percent higher funding. He suggests that the tax advantage afforded to pension funds would be the main reason for their growth or even their existence (1995: 23).

Although more empirical researches are required to prove a causal connection between preferential tax treatments and developments of private pensions, it is clear that saving flows are very sensitive to tax incentives, given the experience in some OECD countries. The United Kingdom saw far-reaching changes in the supplementary pension system after the introduction of the 1986 Social Security Act, which aimed at encouraging the growth of defined contribution pension plans and personal pensions. In 1987 tax-privileged assets attracted about three-quarters of the total flow of UK savings

(Leape, 1990). By 1994 two-thirds of employees in Britain were covered by private contracted-out pension schemes (Barrientos, 1998). In the United States Individual Retirement Accounts (IRAs) were first introduced in 1974 to provide a tax-preferred saving program for employees without pension plans. The tax advantage was the ability to defer paying taxes on the pension contribution until the assets were withdrawn at retirement, with no taxes being paid on accumulated funds. In 1981 eligibility was increased to all households and limits were increased under the Economic Recovery Tax Act. In one year contributions rose from $5bn to $28bn and by 1986 IRA saving represented about one fifth of aggregate personal saving. In the Tax Reform Act of 1986 high income tax payers with employer-provided pensions were excluded from making tax-deductible contributions. Total contributions immediately fell by 62 percent in 1987 and since then have remained low (Hubbard and Skinner, 1996).

The sensitivity of saving flows to tax incentives is also evident from the changes in tax policies in New Zealand. Historically tax privileges were given to private pensions especially occupational pensions, in almost all industrialised countries. In other words, OECD countries employed broadly the same tax rules: no taxes applied to contributions and fund income until pensions were paid out, i.e. the EET type of tax system. However, since late 1980s and early 1990s some countries, including Sweden, Denmark and New Zealand, have made radical changes by taxing fund returns. It is noticeable that New Zealand has taken the boldest steps by taxing all contributions and fund incomes under the same tax rate as other forms of saving.

In New Zealand from December 1987, employee contributions were made from after-tax income to superannuations (private pensions); since 1989 employers' contributions have been taxed at 33 percent and since 1990 asset returns have also been taxed at 33 percent.[34] Pensions are thus treated exactly the same as all other forms of saving. According to Stephens (1993: 54), "The real reason was a desire to bring forward tax revenue for budget deficit purposes." Another main purpose of the reform, explained by the OECD (1993a: 10), was to improve the neutrality of the tax system by no longer selectively favouring one form of savings over another.

[34] See Dilnot (1992), Stephens (1993). The reform is extensively examined in OECD (1993).

It is not surprising that the New Zealand pension industry saw a great deal of response by sponsors and pension companies immediately after the tax reform. Some pension schemes, including the Government Superannuation Fund (GSF) and those offered by the National Provident Fund (NPF)[35], reduced pension benefits to existing and future pensioners. Personal pension schemes, such as those offered by Life Offices that had been proved to be a useful and tax-effective way for individuals to supplement their state pensions, were closed to new members following the 1987 reform. The ability of members to transfer funds to another scheme declined sharply from 50 percent of surveyed schemes in 1989 to only 24 percent in 1990. The trend away from defined benefit schemes to defined contribution schemes accelerated sharply in 1989-1990 in response to the increased cost of private pension provision brought about by the tax changes. According to data from the Government Actuary, the relative size of private pension funds fell from 18 percent of GDP in 1987 to 16 percent in 1990. On the other hand, due to the preferential tax treatment on house purchases, which provides imputed income tax-free together with a tax-free capital gain, the most important form of savings by individuals in New Zealand has been the purchase of a house. It is reported that the percentage of elderly people living in mortgage-free owner-occupied housing has been quite high: in the 1986 census 73 percent of those aged 60 and over lived in their own mortgage-free houses (OECD, 1993a: 27).

The New Zealand story has proved the assertion by Ippolito (1986), Davis (1995) and Clark and Wolper (1997) that were the preferential tax status of employer-sponsored pension plans removed by taxing the earnings of those pension funds, the price of a dollar of retirement income for a pension participant would increase sharply. The increase in the price of retirement benefits to workers would be expected to substantially reduce the demand for employer-provided retirement plans.

Some other countries such as the United Kingdom, Canada, Norway and the Netherlands also have considered or been considering reforming their pensions tax systems by introducing the tax regime of ETT or TTE in attempt to make them less generous. However, no propositions have been put into force. In Norway, for example, a

[35] GSP covers central government employees. NPF covers local government employees, and also provides superannuation for individuals, companies, and industries in the private sector.

commission was appointed in 1993 to investigate the tax issue under the proposal of subjecting pension funds to a wealth tax (plus a capital gains tax on the interest in the fund). Although the commission found no strong savings arguments for continuing to treat private pensions more favourably than other types of savings, the tax preferences are still maintained (Overbye, 1999). One of the important reasons for this policy decision is that during the 1990s there were a series of mergers between banks and insurance companies, reducing pressures from banks to equalise tax treatment of pensions and other financial assets. In Canada, for another example, considerations of whether to continue the preferential tax treatments for Registered Pension Plans (RPPs) and Registered Retirement Savings Plans (RRSPs) under the present income tax structure are controversial. They have always been the concern of policy actors and experts. Due to the high income tax in Canada[36], it has been believed that removing tax privileges for private pensions by taxing fund incomes can broaden the annual income tax base and bring the personal income tax rates down. This has been argued to be good policy under the assumption that it would be fair and efficient. However, due to the fact that taxation of saving would bring other forms of inequality and inefficiency to the economy, it is hard to conclude that a broad-based income tax with low rates is efficient or fair. Therefore, whether the preferential tax treatment on pension funds should be cut in Canada is still an open question.

Should private pensions be taxed as other forms of saving (referred to as 'levelling down' in the UK) or should other forms of saving be taxed as private pensions (referred to as 'levelling up' in the UK)? This is a question of whether it is generally a good idea to tax return on savings (i.e. is EET/TEE better than TTE/ETT, or vice versa?), which is discussed in the next section.

[36] In Canada, the standard federal tax rate is 29 percent (on taxable income in excess of C$6000). A 5 percent high-income surtax also applied to basic Federal tax in excess of C$15500. Thus the combined Federal top rate is 30.45 percent. The average rate of Provincial income tax is 18.1 percent, not deductible for Federal tax purposes. Thus, the combined top income tax rate is 48.6 percent (OECD, 2000).

4.3 Should Savings be Taxed?

This section focuses on the tax treatment of savings in the light of debates and reforms on tax advantages to private pensions in some OECD countries. It compares the two alternative models of personal income taxation that are usually considered as terms of reference in the analysis of the tax treatment of savings: the Income Tax system and the Expenditure Tax system. The comparative analysis centres on the taxation of return on savings on the grounds of economic equity and efficiency.

4.3.1 Equity

An income tax system (IT) aims at taxing all forms of income equally. Income is usually defined in a very broad sense that includes capital gains. According to Schanz-Haig-Simons and many other supporters of the income tax system[37], income is the accretion to power to consume. It consists of a person's actual consumption (C_t) plus or minus any increase or decrease in the value of his power to consume in the future as measured by his net worth (ΔW_t). Therefore the tax base for IT can be expressed as the algebraic sum of ($C_t + \Delta W_t$). Income consists of wages, interest receipts, dividends, rents and capital gains. Alternatively, income may be defined as potential consumption, i.e., actual current consumption plus consumption forgone, as reflected in increased net worth. An expenditure tax system (ET), advocated by Kaldor in 1955[38], is equal to the Schanz-Haig-Simons income less net saving. Net saving is equal to the increase in a person's net worth. The tax base of ET is equivalent to IT excluding the yield of capital (R_t), which is ($C_t + \Delta W_t - R_t$). Under the ET system savings are exempt while only consumption expenditure is taxed. A tax on expenditure could be implemented through three approaches. The first way of taxing only expenditures is through indirect tax, such as VAT. The second is a pre-paid expenditure tax (PET). Thus, interest receipts, dividends, rents and capital gains would all be exempt. The third is referred to as

[37] See Goode, "The Economic Definition of Income" in *Comprehensive Income Taxation* edited by Pechman in 1977. According to Musgrave (1968), the concept of income was first proposed by George Schanz in 1896. It was developed systematically by Henry Simons in 1938 in *Personal Income Taxation.*

[38] The introduction of the idea of an expenditure tax may have been earlier than income tax. Earlier as in the Seventeenth Century Hobbes argued that equity requires taxing people in accordance with what they consume rather than what they earn (Kaldor, 1955: 11).

registered-asset expenditure tax (RET). This approach, which taxes economic activities on cash-flow basis, postpones the taxation on amount saved until it is spent, at which point the savings and the return are taxed.

The relative merits and demerits of IT and ET have been extensively examined in the literature.[39] Advocators of the ET regime put forward three main justifications. First they argue that the taxpayer must be taxed in line with what he "takes out of the social pot" and not what he "contributes to society" (Kaldor, 1955). Second, the ET regime does not cause double taxation of savings involved in an IT regime. Under ET tax is payable only when consumption occurs hence no tax is due on the part of income that is saved. Under IT, on the other hand, the taxable income includes not only the receipt of income but also the return obtained by lending or investing any savings made out of after-tax income. Therefore, under the ET system a man who lives on a certain scale and obtains his income from work is not more severely taxed than another man who secures the same standard of living from capital (ibid: 89). Finally, ET is better than IT if it is believed that a tax system based on lifetime income generates higher equity than one based on annual income (Goode, 1980: 55).

The supporters of an Income Tax system build their arguments upon the following three main aspects. First, they believe that an equitable tax system must take proper account of ability to pay. IT is better than ET in measuring a person's ability to pay because the total increase in a person's power to consume is a better indicator of ability to pay than the exercise of the power to consume. A person's decision to save a portion of his income is an individual choice and does not lessen his capacity to satisfy his private wants (Goode, 1980: 52-53). Exempting returns on savings results in an incomplete measure of ability to pay which would lead to greatly enhanced savings by the richer classes, and thus to an even more unequal distribution of wealth in the long run. The second argument for IT as a model for personal income taxation states that private investment is a withdrawal from the common pool, therefore private savings should be taxed in order to restrain the private use of economic resources (ibid: 53). The third argument against the exemption of savings (perhaps not so convincing) is that savings

[39] Among the most influential works see Kaldor (1955); Mead (1978); Pechman (1980) and Auerbach & Kotlikoff (1987).

result in the ownership of property. The services provided by the state to property owners are more extensive and cost more than those provided to the community at large. Therefore it is fair to require property owners to pay more taxes than others (Kaldor, 1955: 88).

4.3.2 Efficiency

Although there are arguments for equity from each side, however, the Income Tax regime causes economic inefficiency that does not occur in the Expenditure Tax regime. In other words, it discourages private savings by a distortion of the choice between current and future consumption.

The distinct effects of the two systems on the timing of consumption can be illustrated algebraically. Suppose that an individual has an income that amounts to Y and t_C is the current rate of income tax (tax rate on goods under an ET). His current consumption CC can be expressed mathematically as follows:

$$CC = (1 - t_C) \times Y$$

Suppose that the same individual decides to postpone his current consumption by investing or lending the post-tax income and earns interest i, interest i being the premium for deferring consumption. Since saving is not taxed under an ET system, the future consumption FC_{ET} will be

$$FC_{ET} = (1 - t_C) \times Y \times (1 + i)$$

In this case, the individual can choose between consuming now $(1 - t_C) \times Y$ or deferring current consumption by saving and having an extra-value of $(1 - t_C) \times Y \times i$ to spend in future. With the interest i he can earn from his saving, the individual would evaluate current versus future consumption at the rate of:

$$\frac{CC}{FC_{ET}} = \frac{(1 - t_C) \times Y}{(1 - t_C) \times Y \times (1 + i)}$$

It can be seen from the above equation that the ET system is fiscally neutral between consumption now and consumption in future. Therefore it does not affect the individual's decision on when to consume.

However, under an IT system the situation is different owing to the tax t_i imposed on the interest i, in which case future consumption is:

$$FC_{IT} = (1-t_C)\times Y \times [1+i\times(1-t_i)]$$

Under these circumstances, the individual can only have an extra value of $(1-t_C)\times Y \times i \times (1+t_i)$ on his future consumption. It is apparent that the individual now evaluates current versus future consumption at the rate of:

$$\frac{CC}{FC_{IT}} = \frac{(1-t_C)\times Y}{(1-t_C)\times Y \times [1+i\times(1-t_i)]}$$

If the individual would prefer to consume in the future $(1-t_C)\times Y \times (1+i)$ to the detriment of current consumption $(1-t_C)\times Y$ but at the same time he would rather consume in the present instead of consuming in the future an amount of $(1-t_C)\times Y \times [1+i\times(1-t_i)]$, then the tax on the interest will have been the cause of an economic inefficiency.

A numerical example may demonstrate the different effects of the two tax systems upon the return on the individual's savings (Table 4-2). Suppose that an individual has earned \$100 of dispensable income and that there is a tax on either his income or consumption. It is assumed that the tax rate, 50 percent, is identical under the two tax systems. The left part of Table 4-2 shows that without saving the individual would add the same amount of value to his current consumption (\$50) after paying either of IT or ET taxes. However, instead of spending the \$100 he saves his income, postponing his consumption tax payment until the savings are consumed. He can lend or invest his savings and obtain a return of 10 percent by doing so. The right part of the table is clear that, with a 50 percent tax rate, under the IT regime the individual has the choice of spending on consumption a single lump sum of either \$50 now or \$52.5 in future and

under the ET regime (either under the RET tax method where the return to saving is allowed to be exempt or the PET tax method where the taxation on the amount saved is postponed until consumption), a choice of spending on consumption a single lump sum of either $50 now or $55 in future. Thus, if the individual decides to save rather than to spend he will obtain a return of only 5 percent on his postponed consummation under the IT regime but a full 10 percent on his postponed consumption under the ET regime.

The above example shows that there is a fundamental difference between the two tax systems upon the return to savings. Under the IT system the after-tax rate of return (5%) is lower than the pre-tax rate of return (10%). Under the ET system, on the other hand, he can obtain an after-tax return from saving which is equal to the pre-tax rate of return on loans or investments (10% for both). Kaldor states that when one consumes an income from saving, he consumes more than he would have consumed if he had spent the original money instead of saving it. The income from saving is the economic reward of "waiting" or compensation for "abstinence". The Income Tax system "reduces the economic 'reward from waiting' not only absolutely but relatively to other things; it disturbs the relationship of prices between present goods and future goods, in favour of present goods" (Kaldor, 1955: 87). The Expenditure Tax system (on either a PET or a RET tax basis), on the other hand, generates a post-tax return to the investor on any asset which is identical to the pre-tax return; that is, the set of investments that are privately worthwhile in the presence of the tax is exactly the set that would be worthwhile in the absence of the tax. The PET method, i.e. the pre-paid expenditure tax, even "imposes an effective zero tax rate on the returns to savings in all forms...the government is effectively a 'sleeping partner' in every act of saving and does not decrease the return to the saver". (Capital Taxes Group, 1989: 17). Therefore, as far as saving is concerned the difference between pre- and after-tax rate of return to individuals under the IT system creates an inefficiency that does not occur under the ET system. It discourages private savings, indeed, it encourages individuals to consume rather than to save. To what extent the Income Tax regime discourages savings would depend on the elasticity of individual saving with respect to the rate of return received by savers. The more elastic the saving to return, the lower would be the level of private saving resulting from the taxation on returns.

Turning to private pensions, an IT system would require the taxation of investment income earned by the fund plus either contributions paid to the fund or pensions paid from the fund. Within the tax regimes in OECD countries studied at the beginning of this chapter, ETT model (or EtT in Belgium, Denmark, Japan and Sweden) and TTE model (New Zealand) are consistent with the IT approach. On the other hand, an ET system would require the taxation of contributions (PET) or, alternatively, the taxation of pensions (RET). Therefore, the choice must be between the TEE or EET models.

Table 4-2 Tax Treatment of Saving under the IT and ET Systems

With 0% saving			With 100% saving			
Tax regime	IT	ET	Tax regime	IT	ET(RET)	ET(PET)
Gross income	100	100	Gross income	100	100	100
Tax on IT	50	0	Tax on IT	50	0	0
Tax on ET	0	50	Tax on ET	0	0	50
Net consumption	50	50	Post-tax saving	50	100	50
			Gross return (10%)	5	10	5
			Tax on IT	2.5	0	0
			Tax on ET	0	5	0
			Increased consumption	2.5	5	5
			Net consumption	52.5	55	55
			Rate of return on postponed consumption	5%	10%	10%

Source: Author's calculation.

4.4 How Should Saving for Retirement be Taxed?

Noting that returns from most forms of saving are treated as taxable income in most world nations (basically the ETT/TTE model), the current tax treatment of private pensions in the majority of member countries of the OECD implies that pension funds are given fiscal privileges. In other words, retirement savings are taxed more lightly than other forms of savings flows. This section therefore discusses the issue of whether private pensions be treated more favourably than other forms of saving. Section 4.4.1 of this section provides arguments for preferential tax treatments for private pensions, while the issue of distortion between different forms of saving is addressed in Section 4.4.2.

4.4.1 Justifications for Providing Tax Privileges to Private Pensions

In the 1980s governments of many OECD countries made statements that fiscal neutrality between different forms of saving is an important goal but only New Zealand made dramatic change towards it by removing tax advantages to private pension schemes. Why should private pensions be treated more favourably? Individuals have different options between different forms of saving. They may put part of their income in a pension plan during their working life to receive annuities after retirement or can put money in banks for contingencies, buy government bonds, invest in stocks or buy a house. In other words, individuals save not just for retirement but also to cover sickness, unemployment, years of child-bearing, purchase of goods or assets etc.. So why should saving for retirement be specially favoured? The preferential tax status of private pensions may be justified on the grounds of economic and social objectives that cannot be achieved with other means.

(a) Maintaining Post-retirement Living Standards

It is suggested that people are generally myopic/ irrational and/or there is a form of moral hazard/super-rationality[40]. The myopia or irrationality argument rests on the grounds that individuals are ignorant and do not foresee their needs in old age. They can not make accurate estimates of how much they need to save to provide a given post-retirement standard of living. Accordingly, the most effective response may be for government to step in to 'save' people from their own ignorance, by distorting choices to ensure adequate savings for retirement (Dilnot, 1997). Economists also argue that people may be extremely smart or super-rational and know that if they do not take care of their retirement savings society will do it for them. As Boadway (1997: 62) states: "people are essentially correct in predicting the consequence of their behaviour. Governments universally do, in fact, come to the rescue of those who do not provide for themselves".

As pointed out by Diamond (1977), some people do not make enough provision for their retirement. Samuelson (1987) also noted that in the century before 1937 Americans

[40] See Diamond (1977) for the classic discussion of government intervention in pension provision. And also see Dilnot (1992; 1997), Boadway (1997), Davis (1995) and Barr (1998).

were the richest people on earth but most died destitute or dependent on children, state, or charity. He argues that most individuals do not possess consistent ex-ante and ex-post preferences for judgements regarding the future. If the existence of this irrationality/super-rationality hypothesis is accepted, it can form the basis for paternalism in the form of requiring individuals to purchase more insurance cover than they would otherwise have chosen by giving them more tax privileges when buying the "special good" (insurance) for retirement. The role of government is to avoid such a situation by using the tax system in an attempt to induce saving for their retirement. Boadway adds that this argument "lends itself to a reasonable justification for public intervention ..., and ... is perhaps the single most important reason for public intervention in the provision of pensions". Therefore, it can be concluded that providing tax incentives to encourage private pensions would solve the problem of myopia and moral hazard and thus would reduce old age poverty.

(b) Reducing Government Spending on State Provision

Welfare programs such as Supplementary Security Insurance (SSI) and Medicaid in United States, means-tested state pensions in Australia and the United Kingdom, as well as the Urban Minimum Income social assistance in China, to mention but a few, are designed to assist people, including the elderly, with limited assets and income. Encouraging people to contribute money to private pension schemes could save the government money in the long-term by reducing the chance that individuals would qualify for social assistance.

Although in western countries much efforts has been made in past decades to find acceptable ways to contain or reduce the growth in public pension costs, the reductions in public pension benefits and tax burdens have not also reduced the number of retirees or their needs. If individuals fail to save for their old age, the state will have to provide for them during that period. If governments can encourage more people to save for their retirement and also encourage those who already are saving to save more, expenditures on public pension benefits to the retired will fall (Dilnot, 1992). In defence of retaining tax benefits, the National Association of Pension Funds (NAPF) argues that the government should set out a tax "league table" of pensions, savings and investment

vehicles, so that the tax regime can make the greatest contribution to removing people from dependency on state social security benefits. Thus, in the long run dependency on state benefits and government expenditure on welfare will be reduced while the Exchequer will benefit from higher pensions in payment (NAPF, 1998 and 1999).

Saving through private pension schemes, unlike other forms of saving, is most appropriate for retirement income provision because saving flows are tied-up until individuals reach retirement age. However, they are *a priori* less attractive to individuals and therefore need some fiscal privileges. Different forms of savings are often close substitutes in three ways - risk, return and term. The three attributes of different savings instruments are closely related. A risky asset must offer a higher expected rate of return to induce individuals to save in that form. An investment instrument that cannot be withdrawn until long into the future should have to offer a higher expected return than a short-term asset. Pensions contracts in general have long term (as long as 40 or 45 years) and high liquidity constraints (not redeemable before retirement) and high risks (investment risk or company insolvency). Therefore, pensions are not ideal assets for individual savers unless they offer higher expected returns. Due to the fact that other savings instruments also have certain tax preferences, individuals might not necessarily save in private pensions. Johnson (1999) states that: "it is hard to imagine why anyone would voluntarily lock their money away in a pension fund rather than save it in another flexible form - unless there are some fiscal privileges to doing so". This view is clearly expressed by Davis (1993: 44), who suggests on this ground, "pension funds should be tax advantaged even if other forms of savings are not." That people do not save sufficiently when not encouraged to do so is confirmed by the Diamond (1977) study for the United States and the clear evidence in New Zealand.

4.4.2 The Distortionary Effects of Tax Privileges of Private Pensions

It must be pointed out that an explicit encouragement of one form of saving by means of tax privileges through tax exemption or deduction creates a range of tax privileges and penalties for different assets. Economic efficiency in the taxation of saving requires that taxation should generate a 'level playing field' in the sense that savings in the form of different assets should be taxed in the same way. The potential problem with taxing

different forms of savings differently is that it results in different economic entities facing different costs of capital. If other financial assets are taxed, for example under an Income Tax system (either ETT or TTE model), an Expenditure Tax treatment on private pensions, i.e. either the EET model or the TEE model, would result in a distortion of the choice between saving through private pensions and other forms of saving. Thus it would affect individuals' decisions in allocating their income to different investments.

Dilnot (1992) suggests that "contributions to private pension represent a major part of private-sector savings flows, and thus their taxation must fit sensibly with the taxation of other forms of savings. Where private pensions are advance funded... the pension funds are of enormous importance as supplies of capital to industry; any taxation must aim to avoid distortion of the capital market. Taxation of benefits should aim to distort choice as little as possible for the retired". However, this is not the case in reality because we observe a wide range of tax treatments for different forms of saving, such as bank, equities, bonds, pension funds and house, in almost every nation of the world. This will be the focus of the next chapter.

Taxes inevitably distort economic behaviour so the best we can do is avoid unnecessary deviations from neutrality and choose those which are least damaging in their overall economic effect. The distortion of choice between savings for retirement and savings for other purposes might be seen as acceptable if considered necessary in order to achieve wider economic and social objectives or to correct for market failure in retirement savings, as has been addressed in this chapter.

4.5 The Tax Treatment of Lump Sums

Chapter 4 has noted that most OECD countries treat lump-sum payment the same way as pension annuity. However, it is taxed more lightly in some countries, especially in the United Kingdom and Ireland where about 1.5 times of final salary can be paid free of income tax. There should not be any doubt about the positive effect of EEt on encouraging saving for retirement through private pensions. However, this tax model may not have the expected effect in terms of guaranteeing adequate retirement benefits.

Young (1992: 59) suggests that people are very likely to take lump sums when offered, especially if no deterrent exists. Therefore, the issue as to whether a portion of the benefit entitlement may be taken as a lump sum rather than a pension is applicable to all plan designs as it can affect the adequacy of retirement incomes. He adds that the lump sums that people receive are often not used for the explicit provision of retirement income, although it is possible (but questionable) that they go into home ownership or are used in other ways that effectively support living standards in retirement. The ability to choose lump sums instead of pensions also undercuts optional protection for spouses. Furthermore, a large portion of the plan's investment may have to be in liquid assets in order to be available for lump sum withdrawals; this is likely to reduce investment returns. Thus he concludes that the inclusion of lump sum benefits in a pension scheme reduces the scheme's ability to provide lifetime benefits to the retiree and spouse and also reduces the adequacy of retirement incomes of retirees (*ibid.*).

The tax treatment of lump-sum payments is always a contentious issue in OECD countries. In the United Kingdom, for example, there always have been critiques on tax-free lump sums. As it is pointed out in the Wilson Committee report (1980): "Under whatever conceptual framework one considers pensions, the tax-free nature of lump sum is anomalous. It is difficult to justify this on logical grounds." Dilnot (1992) also argues that "There seem to be no strong reasons for treating the lump-sum more favourably than pension payments for tax purposes.... Arguments for supporting retirement savings ... do not imply encouraging lump-sum provisions, rather the reverse". A more generous treatment than the expenditure tax is not justified - either by the impact on national saving or the effect on public pension and social assistance liabilities (Whitehouse, 1999).

Although in the UK there have been strong arguments for the removal of tax-free lump sums, it is a concern of some that two problems might arise from the change in the current treatment. First, the introduction of a desirable transitional arrangement is necessary so as not to penalise the expectations of current pension scheme members who are nearing retirement and who have made plans that take into account the receipt of tax-free lump sums. Second, if lump sums were treated wholly as taxable income in the year of receipt some people would find themselves paying higher tax rates in that

year (Benjamin, B. et al, 1987: 118). Therefore, as it is written in the Wilson Committee report (1980): "it [the tax free lump-sum payments] has become such an accepted part of the present arrangements that its removal could not be regarded as equitable in its effects". In 1985, the Chancellor of the Exchequer raised the possibility of taxing the lump sum but it was not accepted.

In conclusion, the introduction of tax concessions to lump sum payments cannot be justified on the grounds of encouraging savings for retirement. It is not an appropriate tax incentive but a waste of resources in terms of the loss of government revenues which would otherwise be raised. Experience tells us that it is difficult to change a policy, especially in removing fiscal privileges, once it has been put into practice for any length of time. Thus, the tax treatment of lump-sum payment should not be considered in China.

4.6 Conclusion

Private pensions play an important role in the retirement income systems of OECD countries. In most countries, the tax preference takes the form of exempting pension contributions and pension asset incomes while pension payments are subject to taxes. This pattern is characterised as the EET tax model. The consideration of increasing revenues as well as achieving tax neutrality between different types of saving raises objection to providing tax incentives for private pensions. Some OECD countries have made significant changes by moving from the EET/TEE regime to ETT/TTE regime but certain privileges still remain. New Zealand is the only country that treats private pensions in the same way as other savings instruments. Not surprisingly this adjustment has reduced the popularity of pension schemes. Australia has also made some fundamental changes to its taxation treatment of pension plans whilst maintaining some taxation support and compulsory contribution help.

The chapter has highlighted the arguments on the Income Tax system and the Expenditure Tax system with respect to taxation on savings. Although the literature regarding the taxation of savings from the equity point of view has been unable to solve the issue of whether people should be taxed on their full income, including income from

capital, or on their expenditure on goods and services, the Expenditure Tax system seems the better for encouraging savings. It is neutral between present and future consumption by providing investors the same pre- and post-tax return on savings. However, it also has been addressed that a wide range of tax treatments for different forms of saving inevitably distorts economic behaviour because investors' decisions on what to save will more likely be influenced by tax treatments than other economic factors such as market returns.

This chapter puts forward rationales for providing preferential fiscal policy to private pensions. It argues that private pensions should be tax advantaged even if other forms of savings are not because without tax incentives a proportion of the population may not save adequately for their retirement. This is due to the fact that they either are short-sighted and unable or unwilling to see far enough into the future to plan for their own retirement or they are free-riders and anticipate that the government will provide for them if they do not save for themselves. Therefore, adequate retirement saving through tax advantages afforded private pension schemes may fulfil at least two important economic as well as social objectives – the reduction of old-age poverty and the reduction of public expenditures on the old. Finally, this chapter concludes that exemption on lump sum payments is not an appropriate tax policy for the purpose of encouraging retirement saving.

V. THE DEGREE OF FISCAL PRIVILEGES UNDER DIFFERENT TAX SYSTEMS

5.1 Introduction

In theory, the decision of an investor to invest in a specific asset depends on the investor's preferences about the term, flexibility and interest rates of that asset. It also depends on the systematic risk and historical performance and also the way the asset is treated by tax codes which determine the return the investor can expect to receive thus affect his or her investment incentives. The preceding chapter has stated that governments in most OECD countries have been providing certain preferential tax treatments on private pensions by giving exemptions to employers/employees and/or private pension funds. The value of these tax incentives has been an important factor in the development of these pension schemes. This chapter provides further empirical evidence of how saving for retirement through private pensions is more lightly taxed than other forms of household saving in some OECD countries. By comparing the *Degree of Fiscal Privilege* of private pensions in China and in five selected OECD countries, this chapter examines one of the important obstacles to the development of private pensions in China - the tax system. In addition, this chapter highlights the possible impact of tax incentives on individuals' saving behaviours if the tax rules of private pensions of some OECD countries were to be introduced in China.

The structures of the rest of this chapter are as follows. Section 5.2 presents the derivation of the formulae employed in calculating the *Degree of Fiscal Privilege*. Section 5.3 studies in detail the tax systems in China and five OECD countries. It then sets up the assumptions for the calculations of DFiP and analyses the sensitivities of DFiP values to the changes in those assumptions. Section 5.4 compares the DFiP of private pensions under the differential tax treatments in China and five countries. Section 5.5 attempts to recommend some important policies as supplementary approaches to tax incentives for promoting a private pension system in China. In addition, the equity implications of the tax concessions on private pensions are also addressed. Section 5.6 concludes the chapter.

5.2 The Concept of the Degree of Fiscal Privilege

In 1984 professor John Hills developed the *Degree of Fiscal Privilege* (Hereinafter "DFiP") as a measure of fiscal privilege. According to his definition, DFiP is the difference between an investor's marginal income tax rate and the effective tax rate on the real returns of the asset in question. If the former is higher than the latter (a positive DFiP), then the asset is fiscally privileged. In other case (a negative DFiP), the asset is fiscally discriminated. The effective tax rate is defined as the tax paid on the asset expressed as a proportion of the real pre-tax return on the asset. Therefore, if an individual's marginal rate of income tax is fixed, then DFiP will be wholly determined by the effective tax rate of the asset. This section briefly describes how the effective tax rate of an asset is calculated; the OECD 1994 report has a fuller derivation of the formulae (OECD, 1994: 89-95; Annex 2).

5.2.1 The Minimum Post-tax Required Rate of Return

If an investment is very profitable or very unprofitable then taxes are unlikely to affect saving incentives. The basic idea that is considered here is the effect of the tax system on the borderline between investments that are viable and those that are not - the effect on marginal investment, which generates net return just sufficient to make the investment worthwhile. It is assumed that an additional $1 is considered by the saver to be invested in a particular asset, for instance, shares or a private pension. It is assumed that all cash-flows (return received or taxes paid) of the investment take place at the end of a period. The expected net present value of the investment of the additional $1 is:

$$NPV = -1 + \sum_{u=0}^{\infty} \frac{R_u - T_u}{(1+\rho)^u} \qquad (1)$$

Where R_u is the expected gross cash-flow, or pre-tax return, at the end of year u, T_u the expected flow of tax payments at the end of year u, and ρ the discount rate. Since this is the case of a "marginal" investment, one that is on the borderline of economic viability, the net present value is zero, hence:

$$\sum_{u=0}^{\infty} \frac{R_u - T_u}{(1+\rho)^u} = 1 \tag{2}$$

In each period the asset earns a given pre-tax minimum required rate of return on the start of period asset stock which is denoted as P. This rate of return P may be obtained as a combination of income and a change in the asset value (e.g. capital gains) and is represented in the following equation:

$$P = \frac{y_u + g_u - \pi}{1+\pi} \tag{3}$$

where y_u is cash income in current prices as a proportion of the asset stock, denominated as *gross return* for the rest of the Chapter, g_u is the nominal rate of growth of the asset over year u in current prices and π is the rate of inflation. This equation can be arranged as:

$$y_u = P(1+\pi) + \pi - g_u \tag{4}$$

For any given required pre-tax rate of return P and holding period, one can calculate the growth of the asset stock g_u and the gross cash-flow y_u through a fixed ratio of g_u to y_u. To simplify the calculation, it is assumed that the total expected rate of return P and the ratio of g_u to y_u remain constant over the holding period, ignoring the variation of the level of income and gains over the holding period.

If the asset is held for period n (and there are no cash-flows after), the investor receives cash income during the holding period and a consideration on sale but may be liable for taxation. The net present value of this possibility V_n is given by:

$$V_n = \sum_{n=1}^{\infty} a(1-a)^{n-1} \left[\sum_{u=1}^{n} \frac{y(1+g)^{u-1}}{(1+\rho)^u} + \left(\frac{1+g}{1+\rho} \right)^n - 1 - T_n \right] \tag{5}$$

In the above equation:

- $\frac{y(1+g)^{u-1}}{(1+\rho)^u}$ is the expected present value of cash income received at the end of year u.

- $\left(\frac{1+g}{1+\rho}\right)^n$ is the expected present value of the growth of the asset stock at the end of year n.

- a is a fixed turnover rate with which the asset will be sold in each period. For example, if the asset in question is sold a year after the purchase, then $a = 1$. If the asset is sold after five years of holding period, then $a = 0.2$. The term $a(1-a)^{n-1}$ (and $a \leq 1$) indicates the probability that an asset will be sold at the end of n periods.

- T_n is the expected present value of all taxes due. It should capture all kinds of taxes and allowances but for simplification in the calculation, all taxes considered here are incorporated into five broad categories, i.e., the tax on cash income, the tax on realised capital gains (with or without indexation), the tax on gross asset purchases (e.g. stamp duty), the tax on sales of the asset and the tax on the stock of the asset (wealth taxes). Thus,

- $t_y y(1+g)^{u-1}$ is the flow of tax on cash income in each period u that the asset is held, where t_y is the tax rate on cash income.

- $t_w(1+g)^u$ is the flow of tax on asset stock in each period u, where t_W is the tax rate on wealth as a proportion of market value.

- t_p is the flow of tax on purchase levied on the acquisition cost in the period 0 when the asset is purchased.

- $t_s(1+g)^n$ is the flow of tax on sale in the period n when the asset is sold, where t_S is the rate of tax on gross sales.

- $t_g\left[(1+g)^n-(1+d\pi)_n\right]$ is the flow of tax on capital gains in the period n when the asset is sold, where t_g is the statutory rate of capital gains tax and d is set to 1 for an indexed tax system and 0 for an unindexed system.

- t_C is the flow of tax deduction on saving which is the statutory rate at which investments or contributions can be deducted.

Applying these tax treatments to equation (5) yields:

$$V=-(1-t_c)-t_p+\sum_{n=1}^{\infty}a(1-a)^{n-1}\left\{\sum_{u=1}^{n}\frac{\left[y(1-t_y)-t_w(1+g)\right](1+g)^{u-1}}{(1+\rho)^u}+(1-t_s)\left(\frac{1+g}{1+\rho}\right)^n-\frac{t_g\left[(1-g)^n-(1+d\pi)^n\right]}{(1+\rho)^n}-T_n\right\} \quad (6)$$

Arranging (6) for $V = 0$ and assuming the geometric series yields a value for the discount rate:

$$\rho = y(1-t_y)-t_W(1+g)+g-Z_g(g-d\pi)-Z_S(1+g)-(T'-t_C+t_p)[\rho-g+a(1+g)] \quad (7)$$

Where: $Z_g = \dfrac{t_g a(1+\rho)}{\rho+a-d\pi(1-a)}.$

$Z_S = at_S$

$T' = \sum_{n=1}^{\infty}a(1-a)^{n-1}T_n$

T' is the expected present value of special taxes less allowances, while Z_g and Z_S can be interpreted as accruals rates of capital gains tax and sales tax allowing for the possibility of indexation to inflation. Thus, the discount rate ρ is the marginal condition for an investment with zero present value after taking account of all tax treatments.

5.2.2 The Five-step General Procedure for Calculating DFiP

(a) To calculate interest income and capital gains (y and g)

It is assumed that the yield is split between the interest income y and capital gain g while $y + g = P(1+ \pi) + \pi$. Equation (4) gives the relationship between the pre-tax required

rate of return P and the gross rate of return, that is the sum of income and capital gain. The ratio of y to g is fixed for each of the assets examined at the start of holding period (in Table 4-1) and remains constant over the holding period. Therefore the interest income y and capital gain g can be solved combining the following equations with the split:

$$y = P(1+\pi) + \pi - g$$
$$g = P(1+\pi) + \pi - y$$

(b) To calculate the discount rate (ρ)

The general equation for calculating the discount rate is given by equation (7) in which all the tax treatments are incorporated.

$$\rho = y(1-t_y)-t_W(1+g)+g-Z_g(g-d\pi)-Z_S(1+g)-(T'-t_C+t_P)[\rho-g+a(1+g)]$$

(c) To calculate the post-tax required rate of return (S)

The required post-tax rate of return is given by the equation:

$$S = \frac{1+\rho}{1+\pi} - 1$$

(d) To calculate the effective tax rate (τ)

Divide the difference between pre-tax and post-tax rate of return (tax wedge) by the pre-tax rate of return, giving the effective tax rate:

$$\tau = \frac{P-S}{P}$$

(e) To calculate DFiP

The DFiP is the difference between an investor's marginal rate of income tax (m) and the effective tax rate (τ) on the return of the asset.

$$\text{DFiP} = m - \tau$$

5.2.3 The Discount Rate of Private Pensions

In the case of pension funds, the calculation becomes less straightforward due to the existence of the investment intermediary. The calculation can be divided into two stages. The first stage obtains the post-tax return to the fund ρ_f. The second stage finds the post-tax return to the individual saver ρ, assuming that the fund's post-tax rate of return is equal to the saver's pre-tax rate of return. Therefore, the minimum required return ρ (post-tax return to the saver) is given by:

$$\rho = \left[\frac{(1-t_y)(1+\rho_f)^n}{1-t_c}\right]^{\frac{1}{n}} - 1 \qquad (8)$$

Where: ρ_f is the post-tax return to the fund;

n is the number of years that the saver is contracted to reinvest in the fund;

t_C is t he rate at which the individual saver's contributions to the fund are deductible; and

t_y is the saver's marginal rate of income tax.

When equation (8) incorporates the cases that either full (or part of) contributions, or full (or part of) pension pay-out can be tax-free, the discount rate will be:

$$\rho = \left[\frac{[1-(1-C_y)t_y][(1+\rho_f)^n - 1] + 1 - (1-C_c)t_y}{1-t_c}\right]^{\frac{1}{n}} - 1 \qquad (9)$$

Where: C_y is the fraction of the income within the fund which can be paid out tax free;

C_C is the fraction of contributions which can be paid out tax free;

$[(1+\rho f)^n - 1]$ is the income within the fund;

$[1-(1-C_y)t_y]\ [(1+\rho f)^n - 1]$ is the saver's after-tax return on the yields of the fund and

$[1-(1-C_C)t_y]$ is the saver's after tax return on the contributions adjusted for contributions deductibility.

Equation (9) can be simplified to:

$$\rho = \left[\frac{[1-(1-C_y)t_y](1+\rho_f)^n + (C_c - C_y)t_y}{1-t_c} \right]^{\frac{1}{n}} - 1 \qquad (10)$$

5.3 Tax Treatments of Financial Assets and Assumptions for the Calculations of DFiP

This section gives a detailed description of the tax treatments of five financial assets, i.e. bank deposits, government bonds, shares, private pensions and owner-occupied houses in China and five OECD countries. It then sets up assumptions for the calculations of DFiP under each of the tax systems in order to examine the extent to which, if any, private pensions are granted tax privileges in these countries. The five OECD countries chosen in the comparison are France, Germany, Sweden, New Zealand and the United Kingdom. The reason for this choice is that their tax treatments on private pensions are different, as examined in the last chapter. France has the EET model, Germany has the TEE model (for pension funds), Sweden has the ETT model, New Zealand has the TTE model and the United Kingdom has the EEt model.

5.3.1 Tax Treatments of Financial Assets in Sample Countries

Table 5-1 shows the marginal rates on labour income for standard rate and top rate taxpayers in both China and selected OECD countries. For the five OECD countries, the top marginal rates of tax come from the 2000 edition *OECD Tax Data*base and for the year of 2000. The standard marginal rates of income tax relate to an 'average production worker' and come from the 2000 edition of the OECD's *Taxing Wages* and for 1999. Columns 4 to 7 of the table present the tax treatments of the five financial assets. Information for China comes from the 1996 edition *China Taxation Handbook.* Tax rates on income of interest and dividend in OECD countries are obtained from the 2000 edition *OECD Tax Database,* while that of capital gains come from "Tax and the

Economy: A Comparative Assessment of OECD Countries" in *OECD Tax Policy Studies*, No. 6, 2001. The "other taxes" in the last column includes wealth tax and taxes on asset purchases and sales, which can be found in the OECD 1994 report. Finally, the tax treatments on private pension in the OECD countries are not shown in this table, but in Table 4-1 of the last chapter. These follows the general picture of tax systems in the six countries.

(a) China

Bank deposits: Before an amendment to the Personal Income Tax Law was adopted after much debate, eliminating personal savings accounts from the list of non-taxable income, interest income were free of tax. According to the State Tax Bureau Document 180 of 1999, a 20 percent rate is imposed on interest income from bank deposits.

Bond ownership: The government bond is the most privileged asset in terms of fiscal treatment. As in most countries of the world, there is no deduction on purchasing government bonds. However, income from both interest and accruals of capital gains are free of personal income tax as well as capital gains tax, nor is tax applied on the disposal of bonds.

Share ownership: The tax rate on dividend income is 20 percent. For each instance of buying and selling shares the total cost is 0.75 percent of traded value (the State Council Document 11 of 1988), which includes 0.4 percent of stamp duty and 0.35 percent agency charges. Thus, the total tax liability on shares is 1.5 percent. There are no other tax liabilities.

Private pensions: In fact, there has not been any formal regulation on the tax treatment of membership in China. Employee contributions to enterprise supplementary pension schemes are not deductible form income tax liability.[41] Similarly, contributions from both employers and employees to individual saving plans through insurance companies and commercial banks are fully taxed. Fund investment incomes are subject to corporation tax at 33 percent except returns on government bond investments. Benefits

[41] 5 percent of total wages from employer contributions is treated as labour cost.

are also taxed under labour income at individuals' marginal rates. Therefore, the current tax model on private pensions is TTT.

Home ownership: The tax treatments on properties are under the regulation of the local governments and vary across provinces and municipalities. For example, a stamp duty ranging from 3-5 percent is levied on the market value of house purchases. The rate in Beijing is 4 percent, while in Shanghai it ranges from 0.75 percent to 1.5 percent. The calculated DFiP later in this chapter is for the city of Beijing. According to the regulations by the Taxation Administration of Beijing, buying and selling a house/flat in the city of Beijing incurs 4 percent stamp duty and 5 percent on the market value of the house sale. Capital gains are taxed at 20 percent for individuals.

(b) France

Interest income on *bank deposits* and *government bonds* are withheld at 15 percent, creditable against income tax liability. Capital gains are taxed at 26 percent. Shares are taxed under an imputation system under which dividend incomes are taxed as labour income but receive a tax credit of 33.33 percent. Also, sale of shares is taxed at 0.3 percent. A 1.5 percent wealth tax is levied on asset holdings by top-rate taxpayers.

Private pensions: contributions to pension funds (and PAYG schemes) are tax deductible up to certain limits. There are no taxes on pension fund asset holdings. Pension payments at retirement are taxed at individuals' marginal rates. The tax model is EET as defined in Chapter 4.

There is 25 percent tax relief on debt finance for owner-occupied housing. Capital gains are exempted if the owner occupies for at least two years. House sales are taxed at 8 percent. Wealth tax is 0.3 percent and 1.8 percent for basic- and top-rate taxpayers respectively.

(c) Germany

In Germany the tax treatment on *bank deposits* and *government bonds* is the same. Interest income is taxed as labour income at marginal rates. The rate of capital gains tax

is 0. The taxation of *share ownership* is also under an imputation tax system. The rate of tax credit is 48.47 percent. Also, a wealth tax is levied on the ownership of bank deposits, government bonds and shares at a rate of 0.5 percent. However, this is only applied to top-rate taxpayers.

Private pensions: As stated in the last chapter, the taxation of private pensions in Germany depends on the method of pension funding. For the book reserve type of pension there is no tax charge to employees until pensions are paid - a book reserve type of supplementary pensions follows the common EET pattern of taxation. However, the taxation is different for the direct insurance funds and provident funds, subject to the TEE model. There are no taxes levied on fund income. Contributions are considered as taxable income while pension benefits are taxed very lightly if paid as a pension (only interest earned after pension payments have begun is subject to tax) and not at all if paid as a lump sum. Book-reserved funds and support funds account for more than 60 percent of pension liabilities in Germany.

Debt finance for owner-occupied housing is fully deductible at personal marginal rates. Capital gains are exempted if the owner occupies for at least two years. House sales are taxed at 2 percent. A 0.3 percent wealth tax is paid by top-rate-paying owners, while a 0.2 percent is paid by standard-rate taxpayers.

(d) Sweden

In Sweden, all capital income including capital gains is all taxed at 30 percent. The rate on sales of shares is 1 percent. In addition, a 1.8 percent of wealth tax is levied on the ownership of bank deposit, bonds and shares for top rate taxpayers only.

As defined in Chapter 4, the Swedish tax regime of supplementary *pension* funds is EtT rather than the standardised ETT as returns on pension funds are taxed at 10 percent. Contributions to pension funds are tax exempt but pension benefits are taxed at individuals' marginal rates.

Debt finance for house purchases is deductible at 30 percent. Capital gains are exempted if the owner occupies for at least two years. House sales are taxed at 11.5 percent. House

ownership is taxed at 1.1 percent and 2.9 percent for standard- and top-rate taxpayers respectively.

(e) New Zealand

In New Zealand the tax treatment on *bank deposits* and *government bonds* is the same. Interest income is taxed as labour income at marginal rates. Capital gains are not taxed. The asset of *Shares* is taxed under an imputation tax system with a 33 percent imputation credit on dividends received. There are no taxes on owner-occupied housing except that the value of house purchase is not deductible for income tax purposes.

The tax model on *private pensions* is TTE. Contributions are not deductible but pension benefits are exempted from income taxes. Investment income on funds including bond interest and dividend on shares are taxed at 33 percent.

(f) The United Kingdom

In the United Kingdom interest income on *bank interest* and *government bonds* are taxed at 20 percent for low and basic taxpayers and 40 percent for top rate taxpayers. However, capital gains are subject to income tax at marginal rates for all taxpayers.

Share ownership: Dividends on shares are taxed as ordinary income but credited at 10 percent against income liability. However, the low rate and basic rate taxpayers' tax liability has also decreased to 10 percent, while top rate taxpayers' liability has decreased to 32.5 percent. So, the tax liability on dividends for low and basic taxpayers is zero but is 22.5 percent for top rate taxpayers. Again, capital gains are subject to income tax for all taxpayers. The tax rate on share purchase is 0.5 percent.

Private pensions: In the United Kingdom contributions to occupational pensions are exempted from personal income tax while withdrawals of pensions are taxed at the marginal income tax rate of 20 percent (for lower and basic rate taxpayers) and 40 percent (for higher rate taxpayers). The tax-free lump sum is 1.5 times of pension

members' final salary.[42] Contributions to personal pensions are exempted from personal income tax, subject to age-related limits. Regular pension payments are taxed at marginal income tax rates except 25 percent tax-free lump sums. Investment income of pension funds is not taxed in either case. Therefore, the tax model of private pensions is EEt ("t" indicates a portion of total benefits that is free of tax liability).

Home ownership: Mortgage interest tax relief was given at the basic rate of income tax. Since 6 April 1994 it has been reduced first to 20 percent, then 15 percent and 10 percent in 1999. It was abolished after April 2000. Property tax is levied at about 1 percent (this is Council tax and the rate varies across areas). Capital gains are exempted.

[42] It includes an annual pension of 50 percent of final salary and a tax-free lump sum of 3 times of annual pension. This is equivalent to 25 percent of total benefits received by pensioners.

Table 5-1 Taxes on Labour and Capital Income in China and Selected Countries

	LABOUR INCOME		CAPITAL INCOME			
	Basic rates	Top rates	Interest	Dividend	Capital Gains	Other taxes
China	20	45	Deposits: 20 Bonds : 0	20	House: 20 Others: 0	Purchase of shares: 0.75 Sales of shares: 0.75 Purchase of house: 4 Sales of house: 5
France	21.4	54	Deposits: 15 Bonds : 15	Taxed as labour but receives 33.3 percent imputation credit	Bonds: 26 Shares: 26 House: 0	Sales of shares: 0.3 Sales of house: 8 Wealth tax on the owner of bonds and shares (top rate): 1.5 Wealth tax on house Basic rate: 0.3 Top rate: 1.8
Germany	34.9	51	Interests on bank deposits and government bonds and shares are taxed as labour income but dividends receive 48.47 percent imputation credit		0	Sales of house: 2 Wealth tax on the owner of bonds and shares (top rate): 0.5 Wealth tax on house Basic rate: 0.2 Top rate: 0.3
The UK	23	40	Basic rate: 20 Top rate: 40	Basic rate 10 Top rate 32.5 10percent imputation credit for all	Bonds and Shares: as labour House: 0	Purchase of shares: 0.5 Purchase of house: 1 Wealth tax on house: 1
Sweden	29.7	53.25	30: deposits, bonds and shares		Bonds: 30 Shares: 30 House: 0	Sales of shares: 1 Sales of house 11.5 Wealth tax on the owner of bonds and shares (top rate): 1.8 Wealth tax on house: Basic rate: 1.1 Top rate: 2.9
New Zealand	21	33	Interests on bank deposits and government bonds and shares are taxed as labour income but dividends receive 33 percent imputation credit		0	0

Source: (1) China (1996). *China Taxation Handbook*. The State Administration of Taxation.
(2) OECD (2000). *Taxing Wages*.
(3) OECD (2000). *The OECD Tax Database*. Table 3; Table 5A.
(4) OECD (2001). "Tax and the Economy: A comparative Assessment of OECD Countries", *OECD Tax Policy Studies*. No. 6. Paris.

5.3.2 Assumptions for the Calculations of DFiP

A zero rate of price inflation is assumed to calculate the DFiP of all the five assets. This assumption is due to three reasons. First, for the past few years the rate of inflation in China has been very low or even negative. Second, without the effect of price inflation DFiP values will reflect only the tax effect on the assets. Finally, a zero rate of inflation can simplify the DFiP calculations. However, when calculations take account of inflation factors the DFiP value will be lower. In general, the higher the inflation rate used in the calculation, the lower values of the DFiP obtained.

To concentrate on the tax system *per se*, the same pre-tax rate of return P is used across all assets ignoring variations in the pre-tax yield on the five different assets. The objective of this approach is to examine the pure tax effect on the different assets if they had yielded an *equal pre-tax rate of return*. Given the same pre-tax rate of return (10%), the minimum required rate of return ρ on each of the assetcan be obtained.

It is assumed that different assets, except bank deposits, have different ratios of interest income to capital gains. The ratio for government bonds, 4:1, is the highest, assuming that 80 percent of the total yield results from interest and 20 percent from capital gains. The ratio of 1:2.33 for shares is the lowest, 30 percent of the total yield on shares coming from interest and 70 percent from capital gains. House ownership has a ratio of 1:1.22, assuming 45 percent yield from services while the remaining 55 percent from capital gains. This is because most Chinese people buy a house to live in (or let). The yield for equities and bonds held in pension funds are the same as above. However, the calculation assumes that 40 percent of pension fund assets are bonds while the remaining 60 percent are equities, although in reality pension funds can invest in other assets such as properties. The bond to equity ratio assumed here is due to two reasons. First, it reflects international experiences. In the majority of industrialised countries more than half of pension fund assets are in equities. The pension fund in the United Kingdom has the highest portion of equity holdings in comparison to funds in other OECD countries. Equity assets account for about 70 percent of funds' total assets. Second, from a long-term perspective, equities have higher returns than bonds.

The turn over rate a, as defined earlier, is the proportion of an asset that will be sold in each period. Therefore the length of holding the asset is determined by the turnover rate which is fixed at the start of holding the asset. The higher the rate assumed the shorter the period of holding the asset and vice versa. It is assumed that a is 0.2 for the ownership of government bonds and shares. However, the turnover rates for assets held by pension funds, where the term of a saving contract is assumed to be 15 years, are assumed to be 0.0667 for both bonds and shares. The same rate is also assumed for owner-occupied housing.

The calculations are done for two hypothetical individuals in China: the taxpayer who pays income taxes at a marginal rate of 20 percent and one who pays income taxes at a marginal rate of 45 percent.[43] It must be noted that the calculations of DFiP under the current tax systems in China are rather straightforward but not so under the tax systems in the five OECD countries. In view of the fact that the objective is to measure the degree of fiscal privileges of the five financial assets under the scenario that the tax systems in the five countries are transplanted to China, the DFiP are calculated by using the tax rules on the assets in the OECD countries but not their real tax rates. Therefore, the application of the tax rates to China can be divided into two cases. If the capital income on an asset in question is taxed as labour income (under the same marginal rates) in the five countries, then the marginal tax rates of 20 percent and 45 percent are used in the calculation. For example, in New Zealand interest income on bank deposits is taxed as labour income. However, the marginal tax rates used to calculate the DFiP on bank savings under the tax rules in New Zealand are 20 percent and 45 percent (marginal tax rates in China) instead of 21 percent and 33 percent (marginal income tax rates in New Zealand). Alternatively, if the capital income on an asset in question is taxed separately from labour income or at a different rate, then the ratio of the capital income tax rate to individuals' marginal income tax rate on labour income is applied. In this case, the tax rate on the asset used in the calculation is the above ratio as a proportion of the marginal rates of income tax in China. One example of this is in Sweden where labour income and capital income are subject to two different tax systems. Therefore if the Swedish tax systems were introduced in China, then the tax

[43] 45 percent is the highest bracket of personal income tax in China. As the majority of taxpayers face the 20 percent bracket, this rate can be regarded as a standard rate.

rates on capital income for Chinese standard and top rate taxpayers would be respectively 20.2 (30%/29.7%*20%) percent and 25.35 (30%/53.25%*45%) percent.

As noted earlier, for simplicity all taxes considered here are incorporated into five broad categories including the tax liabilities on cash income, capital gains, gross asset purchases (e.g. stamp duty), sales of assets and, finally, the stock of assets (wealth tax). Therefore, the DFiP values would be lower if an asset is also subject to taxes of other kinds. Moreover, the DFiP values are obtained under savers' marginal rates of income tax without considering any special allowances or concessions. For instance, tax allowances for private pensions in the United Kingdom are worth between 29 and 34 percent more (depending on age) for single pensioners than for people of working age and 39-43 percent for married couples: the extra allowance is withdrawn above a ceiling. The United States offers an extra $1,000 deduction for single pensioners and $1,800 for married couples. Calculations taking account of these concessions would be complex, but the effect obviously would be to increase the DFiP values.

Finally, it must be pointed out that the value of DFiP is very sensitive to the assumptions made on the ratio of interest income to capital gain, y/g and turnover rate a. If the rate of tax on interest income is lower than the rate of tax on capital gain then the higher the ratio of y/g (and the lower the a) assumed the higher the DFiP values can be obtained. On the other hand, if the rate of tax on interest income is higher than the rate of tax on capital gain, then the higher the ratio of y/g (and the lower the a) is assumed the lower the DFiP values can be obtained. However, if interest income y and capital gains g are taxed at the same rate and a is assumed to be 1, then the value of DFiP is indifferent to the rate of split between y and g.

Table 5-2 Assumptions for the Calculations of DFiP

1. Zero rate of inflation in China:		$\pi = 0$
2. A fixed 10 percent pre-tax rate of return:		$P = 10\%$
3. The yield (including interest income and capital gains) of the five different assets based on the following assumptions:		
Bank deposits:	Full yield as interest, zero capital gains.	$y = P = 10\%$, $g = 0$
Bond ownership:	80 percent yield as interest, 30 percent as capital gains.	$y = 80\% \times P = 8\%$ $g = 20\% \times P = 2\%$
Share ownership:	30 percent of the yield as dividend, 70 percent as capital gains.	$y = 30\% \times P = 3\%$ $g = 70\% \times P = 7\%$
Private pensions:	Pension asset holding 60 percent as equities and 40 percent as government bonds. The yield for equities and bonds are the same as above.	$y_b = 80\% \times P = 8\%$ $g_b = 20\% \times P = 2\%$ $y_e = 30\% \times P = 3\%$ $g_e = 70\% \times P = 7\%$
Home ownership:	45 percent of the real return as housing services, the balance as capital gains.	$y = 45\% \times P = 4.5\%$ $g = 55\% \times P = 5.5\%$
4. The turnover rate:		
Bank deposits:		Not relevant
Government bonds:		$a = 0.2$
Share ownership:		$a = 0.2$
Pension contract:		Fixed for 15 years
Bond holdings		$a = 0.0667$
Equity holdings		$a = 0.0667$
Home ownership:		$a = 0.0667$

5.4 The Value of DFiP on Private Pensions and Implications

This section analyses the degree of fiscal privileges, if any, of private pensions in the six countries, based on the results calculated by using the assumptions made in the last section. The first part compares the DFiP of private pensions under the tax system in China with that of the five OECD countries. The second part addresses the problem of unequal distribution of tax benefits between taxpayers if private pensions are taxed under a more favourable tax model.

5.4.1 The DFiP on private pensions

Table 5-3 DFiP Values for the Chinese 20% Rate Taxpayers under the Tax System in China and Five OECD Countries (%)

Tax regimes of pensions	Country	*Deposit*	*Bond*	*Share*	*Pension*	*Housing*
TTT	**China**	0.0	20.0	10.7	-2.0	10.9
EET	**France**	6.0	5.2	9.8	20.0	11.7
TEE	**Germany**	0.0	4.0	22.3	20.0	18.0
ETT	**Sweden**	0.0	0.9	1.7	15.3	6.8
TTE	**New Zealand**	0.0	4.0	23.4	4.4	20.0
EEt	**The UK**	2.6	3.0	8.2	24.5	10.8

Table 5-4 DFiP Values for the Chinese 45% Rate Taxpayers Under the Tax System in China and Five OECD Countries (%)

Tax regimes of pensions	Country	*Deposit*	*Bond*	*Share*	*Pension*	*Housing*
TTT	**China**	25.0	45.0	35.7	-3.4	35.9
EET	**France**	32.5	18.5	9.4	45.0	24.5
TEE	**Germany**	0.0	4.5	39.6	45.0	41.0
ETT	**Sweden**	19.6	5.0	5.2	38.8	12.4
TTE	**New Zealand**	0.0	9.0	45.0	22.5	45.0
EEt	**The UK**	0.0	0.0	12.0	58.7	33.4

The calculated results are presented in Tables 5-3 and 5-4. According to Hills (1984: 28), if DFiP is positive the return is being taxed more lightly than the saver's marginal income tax rate would lead us to expect, whilst a negative DFiP indicates it is being taxed more heavily. By definition, a zero DFiP represents a neutral treatment.

The tables show that private pensions have higher fiscal privileges than other forms of savings in four countries, namely, the United Kingdom, France, Germany[44] and Sweden. This can be seen as a higher DFiP on pensions than on the other four assets. It is noticeable that the value of DFiP varies across the countries, ranging from 24.5 percent in the United Kingdom to 20 percent in France and Germany, and 15.3 percent in Sweden. The variations are a result of whether part of pension fund investment income is taxed and whether part of benefits paid out of funds are tax-free. Private pensions have the highest DFiP in the UK tax system because a quarter of total benefits received by pensioners is excluded from pensioners' taxable income. On the other hand, the value of DFiP under the Swedish tax system is the lowest because part of the yields within funds are taxed, although treated lightly in comparison to other capital income (see Table 5-1).

However, private pensions in New Zealand are taxed basically the same way and at the same rates as bank deposits and government bonds. The very high DFiP on shares is due to the imputation tax system that provides an arrangement by which shareholders who receive a dividend also receive a tax credit for corporate tax and other taxes (such as withholding tax) that the company has paid. Under this system, the tax paid on its distributed profits at the corporate level is fully or partially credited against shareholders' personal income tax liability. The high value of DFiP on owner-occupied housing indicates a preferential tax treatment on house purchases, which provides imputed income tax-free together with a tax-free capital gain. It is stated in the last chapter that private pension funds in New Zealand fell immediately after the 1990 tax reform under which the tax model of pension funds moved away from the EET model to the current TTE model. On the other hand, due to the preferential tax treatment on house purchases, the most important form of savings by individuals in New Zealand has been the purchase of a house.

In China the obtained value of DFiP on private pensions is the lowest within the five financial assets in the comparison. In particular, the negative DFiP means pensions are taxed more heavily than individuals' marginal income tax rates. This is because not only

[44] Except the case in Germany where the standard rate taxpayers have higher DFiP on the saving in shares than that in private pension schemes.

is investment income is taxed within the fund but also both contributions to and pension benefits from the fund are subject to personal income taxation. China is one of two countries in the world that tax all three transactions of pension funds at full marginal rates.[45] Therefore, the high tax burden on pension funds can provide some explanation of the minor importance allotted private pensions in China.

The government bond is the most popular asset in China. This is attributed to its nature of high security (there is no risk) and low tax liabilities (the tax liability is zero). It can be seen from the tables that the DFiP on bonds is the highest among the five assets. Since 1990 the opening of the two stock exchanges in Shenzhen and Shanghai, buying and selling shares has become the daily life of many Chinese people in urban cities. As financial markets develop, if the government does not remove the current generous tax treatment on trading, investment in shares will remain one of the most popular choices for Chinese investors. The introduction of tax on bank interests in 1999 has not reduced the reliance of the majority of Chinese people on commercial banks as a means of saving instrument. This is because the investment choice in China is limited and bank deposits have lower risk and higher flexibility than stocks. It must be pointed out that although the tax treatment on owner occupied housing is quite generous, buying a house is still beyond the reach of the majority of Chinese households due to the fact of low wages and imperfections in credit markets.

If the tax models of private pensions in the five OECD countries are introduced in China, the DFiP on private pensions would be extremely high under the UK tax system, substantially high under the French and German tax systems and relatively moderate under the Swedish tax system. There would be no fiscal privilege for private pensions under the New Zealand tax system. This implies that if China keeps the current tax treatments on bank savings unchanged (equivalent to the tax pattern of TTE) the introduction of any of the three tax models on private pensions - EEt (the UK model), EET (the French model) and TEE (the German model) - would shift part of saving flows from banks to private pension funds.

[45] The other country is Russia. As mentioned in the last chapter, Australia has a "ttt" model on pensions instead of a "TTT" model.

5.4.2 Tax Incentives and Inequality

Table 5-4 shows that, in general, top rate taxpayers have higher DFiP than standard rate taxpayers. This finding may have implications when tax privileges for private pensions are concerned. It implies that, if exemptions are given to private pensions, high income workers gain more because they are in a higher marginal income tax bracket and are able to take advantage of retirement savings plans to a greater extent than low income workers. As Stanley Surrey (1973) describes, these tax benefits provide most support to the most well-off, less to the average, very little to the lower-paid and nothing at all to the poor. Hence the distribution of private pension benefits often provides greater rewards to higher earnings and income categories. They provide very significant 'upside-down' benefits.

The character of unequal distribution of tax benefits is observed by some researchers when examining tax concessions on private pensions in some OECD countries. Ippolito (1986), for example, presents some calculations of the tax benefits of pensions under the US tax code of 1979 and points out that the benefit of the tax exemption of asset returns depends on the rate of return and the tax rates. At an interest rate of 8 percent he calculates that the benefit is 10 per cent of pensionable income for the median worker and 20 percent for those on three times average earnings. Overall, as a result of these tax benefits, a worker on average earnings might obtain a 20 per cent higher pension and a worker on three times average earnings one a 40 per cent higher. He concludes that benefits of pension-tax exemption are regressively distributed. A study for the UK by Agulnik and Le Grand (1998) also shows "a strongly regressive pattern, with those on income over £100,000 receiving an amount equivalent to 3.3 per cent of their income, compared with 0.5 per cent for those on incomes between £3,525 and £4,000. Overall, half the benefit of tax incentive on pension contributions goes to the top 10 percent of taxpayers, and a quarter to the top 2.5 percent". Under such circumstances workers who have not made substantial earnings during their working life are likely to have little net gain from occupational plans. In a private discussion with the author, Agulnik points out that tax concessions are regressive even under a flat-rate tax system because the really poor do not pay tax and secondly, richer people save more (both proportionately and absolutely) so get more benefits. He argues that: "[although] using the tax relief system

to bribe people to make greater pension provision is potentially one way out of the morass of means testing... The current system that favours the better-off, offering more assistance to well paid workers than to low earners, may be reason enough for reform." (Agulnik and Le Grand, 1998; Agulnik, 1999).

The unequal distribution effect of tax systems raises much debate. Based on the examination on the distribution of public and private pension benefits and their relative importance in the income of elder households across a number of countries, Pestieau (1992) states that a significant shift from public to private pension benefits could widen disparities in income among the oldest members of society. Richard Titmuss describes tax treatment of occupational pensions as a form of privilege as higher-salary workers are the primary beneficiaries of occupational pensions. He argues that "the outlines of a dangerous social schism are clear, and they are enlarging.... Already it is possible to see two nations in old age; greater inequalities in living standards after work than in work; two contrasting social services for distinct groups based on different principles, and operating in isolation of each other as separate, autonomous, social instruments of change" (Titmuss, 1958: 73-74). He suggests that tax reliefs should be cut back, thus allowing a much larger Exchequer grant to be paid to the National Insurance Fund and hence allowing the level of universal flat-rate pension benefits to rise, from which the poor would gain most proportionately.

5.5 Making Tax Incentives Work in the Chinese Context

Preferential tax treatments on private pensions in China do not ensure that all individuals have an adequate retirement saving. The following three groups of people may fail to save through private pension even with tax incentives:

- The first group of people are those who have joined the public pension programme. Due to the high level of pension benefits they can receive at retirement, they have a low saving capacity in private pensions or feel no need to save one at all.

- The second group of people includes those who are myopic and super-rational (problem of myopia and moral hazard). They would not save on their own and are

unlikely to do so in the future even if provided with tax incentives. This is because either they can not make accurate estimates of how much they need to save to provide a given post-retirement standard of living or they anticipate that if they do not take care of their retirement savings themselves the government will do it for them.

- The third group of people is those who are currently not covered by the insurance-based public pension and are not able to save for their retirement.

It must be noted that failure to save for retirement may lead to different consequences. The first group would not rely on the government at retirement having not saved because the insurance-base public programme guarantees them adequate retirement income. What concerns the government is the second group whom, having not saved (enough), at retirement it must look after. However, tax incentives will have a minor effect on the last group which has a very low income or lives in poverty. Providing this group with an adequate retirement income will be the Government's responsibility if they are not to rely on their family members or informal transfers from the society. This is a crucial issue and a solution to this is suggested in Chapter 7. This chapter focuses on the first two groups as to what policy should be taken in order to boost retirement saving.

5.5.1 Reducing the Benefit of Public Pension

The level of public pension may reduce the effects of tax incentives afforded to private pension plans. As noted, if the current public pension programme provides generous benefits individuals would not be able or need to save through a private scheme.

In the social-democratic welfare regimes[46], including Finland, Denmark and Norway, the state plays the dominant role in providing for retirement. In this type of welfare regime the public pension programme offers comprehensive, generous and universal entitlements with a clear preference for state provision over private protection. It is believed that the role of such states in constructing systems of social protection dwarfs

and stifles the contributions of both markets and community. Similarly, the corporatist welfare regime, which includes the majority of European continental nations - Italy, France, Germany, Belgium and Austria, also employs state power in order to partially offset insecurities and inequalities in the market system. As in the social-democratic welfare regime, the role of the market in this type of welfare state is minimal in so far as earnings-related benefits ensure the maintenance of previous living standards for the beneficiaries. Thus, the need for supplementary benefits is also reduced. Therefore, the role of the state/market partly determines the relative importance of public/private provisions for retirement incomes in each country. Public pension provisions in both corporatist and social-democratic welfare states offer generous benefits to beneficiaries so that little room is left for the development of private pensions. It can be seen from Appendix (5-1)[47] that these countries with generous public pension schemes have historically had fewer private pensions, even though private pensions are singled out for fiscal privileges. The assets of pension funds as a percentage of GDP (data for 1996) were highest in Finland (40.8%) and Sweden (32.6%)[48], followed by Denmark (23.9%) and, far behind, Germany (5.8%), France (5.6%), Belgium (4.1%), Spain (3.8%), Italy (3%) and Austria (1.2%).

However, in the liberal welfare regimes including Switzerland, the United Kingdom, the United States, Ireland, Canada and Japan, public pension mainly guarantees basic needs in retirement. It is said that in this type of welfare state priority is given to market discipline rather than social solidarity. Therefore, the private sector is seen as the proper place to deal with economic insecurity for all but the least fortunate citizens. As a result, in this system public benefits are modest whilst private pensions are prominent. Data in Appendix (5-1) shows that the pension assets are much higher than that in other OECD countries, with 117.1% in Switzerland, 74.7% in the United Kingdom, 58.2% in the United States, 45% in Ireland, 43% in Canada and 41.8% in Japan.

[46] Esping-Andersen's influential study (1990) grouped 18 OECD countries observed into three social policy regimes: the "liberal" regime, the "social democratic" regime and the "corporatist" regime.

[47] Appendix 5-1 provides the general picture of private pensions in 23 OECD countries including coverage rates, way of establishment of pension schemes (whether the system is mandated or voluntary), method of financing and asset accumulations of funds.

[48] It should be noted that the higher pension assets in Finland and Sweden could be a result of compulsion.

The fundamental point is that public pension wealth could discourage private response, as discovered by Feldstein and Pellechio (1979). A recent study by Richard Disney (1999) shows that the development of private pensions has a negative relationship with public pension expenditure. From a regression of private pension assets (% GDP) on age structure (65^{+}%), real GDP per capita and public pension expenditure (% GDP), Disney has found that a rise in public pension spending commitments would be associated with a halving of the value of the assets[49]. The significant substitution effect of the public pension system on private pension funds indicates that lower public pension commitments may encourage the development of the private pension. The generosity of public pension provisions may hinder the development of private pensions but it does not necessarily follow that with less generous public provision in the future private pensions will automatically grow. Nevertheless, the experience in some OECD countries shows that the private sector does respond to tax incentives as public benefits are made less generous. As Disney puts it: the 'voluntary' route of offering incentives to individuals to make private retirement arrangements at the same time as public arrangements are cut back has proved a popular form of pension scheme transition in developed countries (Disney, 1999: 2).

5.5.2 Mandating Private Pensions

For various reasons[50] some countries have experimented with mandatory private pension plans as an alternative or substitution to earnings-related public PAYG systems. Today approximately thirty world nations have mandatory private saving schemes. These mandated private systems can be classified into two broad clusters, centralised and decentralised schemes. Under the centralised management individuals are compelled to make contributions to a provident fund, which holds an account in their name, managed by a public agency. At retirement, the individual receives his accumulation. The first nationally mandated provident fund, EPF (the Employee's Provident Fund), was established in Malaysia in 1951 and the largest such fund is

[49] He also notes that the level of real income and of financial development of the economy is also positive related to the value of pension assets.

[50] The reasons include the problems of high contribution rate and the unsustainability of public PAYG systems, as well as the motivation to increase private and national saving.

Singapore's Central provident Fund, created in 1955. India and Indonesia established provident funds in the early 1950s, but with limited coverage. Several African, Caribbean and Pacific Island countries followed in the 1960s, 1970s and 1980s (The World Bank, 1994: 213-214). The central feature of decentralised mandatory retirement saving schemes is the crucial role played by private sector financial institutions investing accumulations and administering payouts. Decentralised mandatory retirement saving schemes are operated in Chile, Argentina, Colombia, Peru and some OECD countries, including Australia, Denmark, Finland, Switzerland, France and Sweden. The most famous example is Chile's, set up by the World Bank (1994) as an efficient private saving model; the latest is that of Hong Kong, founded in August 1995. Centrally managed private funds are subject to direct or indirect government controls and are therefore more vulnerable to political risks. However, the administrative costs are generally lower due to the economy of scale. Decentralised saving schemes, on the other hand, are operated on a basis of market competition and are therefore argued to provide higher investment returns but are subject to higher administrative costs.

Compulsory private saving schemes can be justified on two grounds. First and foremost is to correct the private sector's failure at providing retirement incomes. Without mandation individuals may not save (enough), despite tax incentives, when public pensions are reduced. This mainly results from the discriminative nature of private provisions (coverage is focused on big firms, men and high-income earners) and the problems of myopia and moral hazard.

A study by Disney (1999) reports that in the United States when a public pension system is partially replaced by a voluntary funded private pension system individuals do not save enough. He also finds similar evidence in the United Kingdom that many people who have partially opted out of social security in order to buy individual retirement saving accounts are not doing enough saving although "the degree of 'inadequacy' remains contentious". This finding implies that if Chinese government encourages workers to demand a private pension and employers to provide private pension schemes for their workers through employment-related occupational pensions or individual pensions and also mandates adequate rates of contribution to funded pension schemes, both the participation rate and the adequacy of saving would doubtless be increased. The

consequence of a system with an adequate private benefit combined with public arrangements would be to enable retired workers to maintain retirement living standards while avoiding increases in public expenditures on income maintenance programmes.

It is noted that Australia is the only one among the OECD countries studied to implement a tax model of "TTT" in which taxes are levied on all three points of activity - pension contribution, fund accumulation and benefit distribution. Before the tax reform, private pensions in Australia were taxed under the EET model. Since the late 1980s contributions, previously untaxed, have been taxed at 15 per cent, the tax levied on the fund. Investment earnings (nominal income), with capital gains adjusted for inflation, are also taxed at 15 per cent. To offset the tax on contributions, taxes on benefits were reduced by 15 per cent. However, unlike New Zealand, Australia has not seen a dramatic decrease in pension funds. This may be attributed to two factors. First, private pensions in Australia still enjoy some fiscal privileges: the 15 percent tax rate is much lower than the statutory marginal income tax rate applied on labour (47 percent for top rate taxpayers) and capital income (interests and dividends are received gross and taxed as ordinary income). The second and possibly more important reason is that private pensions (Superannuation Guarantee in Australia) are mandatory. In Australia trade union and the federal government require a minimum rate of employer's contribution to superannuation. This rate has been increasing from 3 per cent of wages in 1989 to 9 per cent in 2002. Under this regulation, it is no surprise that the rate of pension coverage in Australia is much higher than in New Zealand, 91.5 percent versus 23 percent in 1998, and was one of the highest in OECD countries of that year. Appendix 5-1 shows that the rates of coverage are generally higher in countries where private provisions are compulsory, with more than 80 percent of the working population covered. Also, the ratio of fund assets to GDP is seen to be very high in these countries, except in France where the mandatory private pensions are financed on a PAYG basis.

The second justification for a mandatory retirement saving is based on the regressive benefits distribution of tax privileges. If more individuals, including low-income workers, were covered by private pension schemes the tax privileges to private pension schemes would be more evenly spread. It may be argued that tax incentive is not necessary if the membership of private pension schemes is mandatory. The role of tax

incentives can be seen as to make the compulsion easier for people to accept. In OECD countries both voluntary and compulsory participation in private pension schemes are implemented in combination with some form of tax incentives.

Mandatory retirement saving, however, also has disadvantages, some of which have been observed in practice. First, mandated participation in private pension schemes would make it difficult for those on low-income, who would not otherwise save, to make financial arrangements for their life time contingencies within a lower capacity of consumption. This may have implications for China where there are stringent controls on financial credits to individuals. Second, compulsory employee contribution would affect saving incentives. They would see contributions as tax as in the public PAYG system. This may create some incentives for tax avoidance and evasion by understating wages or substituting in-kind benefits for wages distribution (World Bank, 1994: 214). Third, high compulsory contribution rates for employers would affect demand for labour leading to higher unemployment. This is because wage rigidity prevents employers from shifting part of their contribution to workers. Singapore has experienced this effect in 1984 when it raised the contribution rate to 50 percent of wages, shared equally by employers and employees. The employers' rate was cut in half the following year because of the belief that this had adversely affected employment (*ibid.*). Finally, a compulsory system is more costly then a voluntary one. The government must have various regulations to ensure that a mandated private pension functions well. The government may have to determine the type of a pension scheme - DB or DC - and the allowable features of private pensions - such as the vesting and adequacy of a pension scheme. It may have to guarantee pensions in case of inflation and enterprises insolvency and give some protection from exposure to investment risks and so on. All the regulatory issues mentioned are particularly important for China where there is an absence of a strong and transparent capital market, a lack of tradition of private pension funds and a lack of familiarity of workers with capital market instruments.

5.6 Conclusion

Following an examination on the tax systems in China, France, Germany, Sweden, New Zealand and the United Kingdom, this chapter has analysed the extent to which private pensions are treated differently from other forms of saving in these countries. The analysis is conducted by comparing the DFiP between private pensions and the other four financial assets, i.e. bank deposits, bond ownership, share ownership, private pensions and owner-occupied housing, under each of the tax system in these six countries.

The DFiP obtained under the assumptions set up in Section 5.3 lead to five main conclusions. First, in France, Germany, Sweden and the United Kingdom private pensions are more lightly taxed than other forms of saving because the DFiP on pensions is the highest amongst all the assets compared. Second, in New Zealand private pensions are taxed basically the same way and at the same rate as other savings vehicles including bank deposits and bond ownership. However, share ownership and owner-occupied housing are more advantageous in terms of fiscal treatment in this country. Third, the private pension in China is heavily taxed both vertically in terms of international comparison and horizontally in comparison to the other four financial assets in China. Fourth, changing the current tax system by reducing the tax liabilities of private pension schemes in China could encourage more individuals and enterprises to build up a retirement pension plan. This is because tax incentives can alter the composition of savings. It can affect investors' decisions as to what asset to choose for their saving purposes (other things being equal). Finally, top-rate taxpayers who pay taxes at a marginal rate of 45 percent have a higher DFiP than standard-rate taxpayers who pay taxes at the marginal rate of 20 percent. This implies that a preferential tax treatment on private pensions will provide more tax benefits to high-income people, which may eventually enlarge the income gap between rich and poor.

From the apparent significance of tax incentives for private pension development in many OECD countries it can be expected that a preferential tax treatment on private pensions in China would provide a high incentive for people to save for their retirement. This chapter recommends two approaches as supplementary policies to preferential tax

treatments, through which self-insurance can be improved. The policies include reducing the replacement rate of the public pension to facilitate the first group's saving and mandating the membership of the private pension to force the second group to save. A tax system favouring private pensions combined with a reduction in public pension benefits and a compulsion of membership would encourage a higher uptake.

VI. THE ESTIMATION OF THE TAX COST Of PRIVATE PENSIONS

6.1 Introduction

There should not be any doubt about the positive effect of the preferential tax treatment on promoting private pensions. However, the preferential tax treatment is, on the other hand, an expense for government revenues. The tax exemption of pension contributions (or pensions) and returns, the likely lower income-tax bracket in which tax will be paid on pensions received after retirement and tax-free lump-sums can make for enormous costs for governments' budgets. With the introduction of the concept of tax expenditures by Surrey in 1973, governments of OECD countries have shown increasing interest in the cost of tax privileges for private pensions. According to Whitehouse (1999), as a percentage of GDP in 1995, tax expenditures on private pensions were 0.1 percent in Germany, 0.9 percent in the United State, 1.7 percent in Australia, 1.9 percent in Ireland and the Netherlands and 2.4 percent in the United Kingdom". Among these the United Kingdom had the highest ratio of tax reliefs to GDP of the OECD member countries (OECD, 1994). Sinfield (1999) stresses that "the tax reliefs to private pensions costs the taxpayer 45 percent more than all selective or means-tested social security assistance paid to the poorest old people". Although the cost of tax reliefs is lower in the United States, "it has historically been the largest contributor to the total; in 1990, of $118bn" (Andrews, 1993).

This chapter attempts to estimate the tax revenues raised under the five alternative tax treatments, i.e. EET, TEE, EEt, ETT and TTE, and to calculate the relative cost of the tax privileges to private pensions with respect to the benchmark tax treatment on bank saving in China, through which the five tax models can be compared from the point of view of the government. The structure is as follows. Section 6.2 gives the proper definition of the cost of preferential tax treatments on private pensions and sets up assumptions for the estimation. In Section 6.3 the five tax models above are compared within the hypothetical scenario that the size of covered population is static. In Section 6.4 annual tax revenue and the relative cost under the five tax models are estimated within the scenario where the size of covered population expands over time. The static

analysis in 6.3 is rather artificial and unrealistic, however, it can achieve an easier and better understanding of the dynamic analysis in 6.4. Section 6.5 draws conclusions on this chapter.

6.2 The Measurement of the Cost of Tax Privileges

Before moving on to calculating the cost of tax privileges on private pensions, it is of importance to specify the concept of cost. The first part of this section aims to define the cost of preferential tax treatments on private pensions. The second part sets up assumptions for the estimation.

6.2.1 The Measurement of the Cost in the Estimation

In 1955 British professor Richard Titmuss (published in 1958: 42-45) defined the cost of tax privileges as a kind of 'fiscal welfare'. In the chapter of "Social Division of Welfare" in *Essay on the Welfare State*, Titmuss examined fiscal welfare and occupational welfare in addition to public welfare. Fiscal welfare is where that social services or social benefits are delivered through the use of allowances, reliefs, deductions and other such preferential tax treatments. Although Titmuss did not use the expression of tax cost, he indicated that these allowances, reliefs, deductions and exemptions etc. cost the government money, even though they do not show up in the budget.

In the United States the concept of tax cost was defined in the Congressional Budget and Impoundment Control Act of 1974 as "revenue losses attributed to provisions of the federal tax laws which allow a special exclusion, exemption, or deduction from gross income or which provide a special credit, a preferential rate of tax, or a deferral of tax liability" (McGill et al, 1999). This definition is accepted by the OECD and was written in the 1994 report: "tax costs are due to special provisions in the tax system that are designed to achieve identifiable social and economic objectives. Such programs are generally carried out through the provision of special exemptions, deductions, exclusions, credits and preferential rates in the tax system" (OECD, 1994:144).

According to this definition, the tax cost in a country occurs when the government loses some amounts of revenue that would otherwise be collected. The foregone revenues result from special tax provisions that are deviations from the essential tax system of that country.

Although the costs of tax privileges are recognised as foregone revenues resulting from provisions that are deviations from the tax system, computing foregone revenues is not straightforward in practice. The problem arises from the need to identify an essential tax system, deviations from which can then be treated as cost. The way of calculating the cost of tax privileges varies across OECD countries due to the different essential tax systems used with which the costs are compared. For instance, in the 1996 OECD review, fourteen of the twenty-four countries took apart. Of these Germany (and the Netherlands and Portugal) reported to the OECD that tax arrangements for old-age pensions were part of the system and did not, by definition, constitute a cost of tax privileges (OECD, 1996, part 2). In the United States (and other countries such as Australia, Canada and Spain), the regular saving account is used as the benchmark: the total cost in the year in question is calculated by summing the tax reliefs on contributions by employees and employers and on pension funds' investment incomes and then taking off tax liabilities on pensions in payment (OECD, 1996: 144). In the United Kingdom, the actual tax treatment of private pensions is compared with unapproved pension schemes, where employees' contributions (employers contributions are deductible as business expenses) and investment returns are taxed but the withdrawal of the pension as a lump-sum is free of tax, though benefits in the form of an annual pension would be taxable. The Inland Revenue uses this as a benchmark with which the approved schemes can be compared. The total cost in the year in question is calculated by adding the estimated taxes that would be paid on contribution to the estimated taxes that would be paid on the earnings accruing to the funds and subtracting the estimated taxes paid on benefits in payment. In fact, both the Treasury of the United States and the Inland Revenue of the United Kingdom use systems close to the Income Tax system, the TTE tax model in particular, in calculating the cost of tax privileges on private pensions, although the benchmark in use in the two countries is different.

As the calculated results are highly sensitive to the choice of the tax system, that choice is significant in measuring the cost of preferential tax treatments. In fact, the cost could be either under- or over-estimated. For instance, Dilnot and Johnson (1993a) calculate cost for the UK based on separate 'benchmarks' of tax-free equity accounts (PEPs) (treated close to the TEE model) and ordinary bank deposits (taxed under the TTE model) and obtain vastly different results, i.e. £1bn *versus* £4bn. They conclude that it is only meaningful within the context of a benchmark against which the cost of tax relief can be measured, then the benchmark in use also determines the size of the cost.

It is obvious that the choice of benchmark tax system for measuring the cost of tax privileges to private pensions should reflect the fiscal policy of that country in which it would be measured. The question of which is the best essential tax system - Expenditure or Income - is a question of whether taxes should be levied on investment income to financial assets in general and to pension funds in particular, as discussed in Chapter 4. One can expect that the answer to this question may vary among countries due to distinctive social as well as economic objectives. If it is argued that all income in China should be taxed - that an Income Tax system is required as the basic tax structure – it is reasonable that the implementation of the ETT or TTE models would have no cost to the government whilst that of EET and TEE would be small. The EEt model, however, would have a large tax privilege cost. On the other hand, if it is argued that all investment income in China should be tax-exempted - that an Expenditure Tax system is believed to be the best system - one can expect that EEt would have small cost while EET and TEE have no cost. ETT and TTE models would suffer very large negative cost.

In this chapter the tax treatment on interest-bearing bank saving is considered a contrasting benchmark tax system against which can be estimated the cost of tax incentives, if any, to private pensions under the five tax models. The choice of this benchmark tax system is not to suggest that China should adopt an Income Tax system. On the contrary, as argued in Chapter 4, private pensions must be treated under the Expenditure Tax system with all investment returns exempted from the tax base of personal income tax. The estimate of the cost of tax privileges requires some assumption about what individuals' reactions would be if tax privileges afforded private pension schemes were available. If savings through private pensions are more lightly

taxed than other types of investment, households may respond by transferring their money from other saving accounts to pension schemes. The result of those changes is to alter the original tax base and to affect government revenues. Thus, a cost occurs when the government loses some of the revenue that otherwise would have been collected. Bank saving is chosen as a benchmark as it is the most significant investment means for the majority of Chinese households. It is probably the most accurate costing as if preferential tax treatments were given to pension funds, saving now made through banks would be likely to move to those funds.

6.2.2 The Estimation Assumptions

The basis of the estimation assumes that a person earns the same amount of earnings each year and saves the same proportion of his earnings annually for a certain number of years in either a private pension scheme or a bank. At retirement, the accumulated savings together with investment returns (including income and capital gains) in both the pension fund and the bank account are used to purchase annuities that can be paid until death. The cost to the government of tax privileges for private pensions can be shown as the difference between the tax revenues received from the pension scheme and that through the bank saving. Cost occurs if tax revenues from pension schemes are lower than those from bank savings. It can be expected that the size of the cost will depend on the deviations of the tax treatments on pensions from those on bank saving. It was noted in the previous chapter that bank account savings in China are currently made from after-tax income. A 20 percent withholding tax is levied on the interest of bank deposits. There are no taxes on withdrawals. This tax arrangement for bank saving can be characterised as the TtE tax regime (here "t" refers to a tax at 20 percent which is lower than the 33 percent rate of corporation tax on pension fund returns). Therefore, the current tax treatment on bank deposits, i.e. the TtE model, is used in the estimation as a bench mark tax model to calculate the cost of tax privileges under the following five alternative models. They are:

- EET model: contributions and investment income tax exempted, pension benefits taxed;

- TEE model: contributions taxed and investment income and pension benefits tax exempted;
- EEt model: contributions, investment income tax exempted, part of pension benefits can be taken as a tax-free lump sum with the remaining pensions being fully taxed;
- TTE model: contributions and investment income taxed, pension benefits tax exempted; and
- ETT model: contributions tax exempted, investment income and pension benefits taxed.

Potential revenues from contributors, pension funds and recipients would be crucially dependent on developments in the economy, especially with regard to economic factors (such as labour force, wages, interests and private pension coverage) and their growth. It is beyond the scope of the thesis to make detailed investigations for projections on these macro- and micro-economic variables. The specific numbers and assumptions made in the estimations about level and growth rate of earnings, rate of contribution, term of investment, life expectancy and investment returns are set for ease of computation. They are presented in Table 6-1.

Table 6-1 Estimation Assumptions

Starting age of work	21
Earliest age of entry to pension schemes	21 (men and women)
Latest age of entry to pension schemes	51 (women) and 56 (men)
Pensionable age	56 (women) and 61 (men)
Life expectancy	78 for men and women, the life span after 60 is 18 years
Estimation period	from 2010 to 2067
Terms of contributions	between 5-30 years
Average wage at start	18,833 Yuan
Wage growth rate	8% (gross)
Rate of contributions to: - pension funds - bank accounts	 10% of total wage p.a. 10% of total wage p.a.
Rate of return on pension fund investment	10% (gross)
Rate of return on bank deposit	3% (gross)
Rate of personal income tax (on contributions and pension benefits)	(a) 20% before and after retirement (b) 20% during working life and 5% after retirement
Rate of tax on fund returns	33%
Rate of tax on bank interest	20%
Percentage of accumulated funds that can be taken at retirement as tax-free lump sum	25% of accumulated fund income
Share of non-agricultural labour force in population group 21-56: - share of labour force in age group 21-56 - share of labour in non-agriculture	 72% 90% 80%

In China there are 11 years of compulsory schooling. If everyone goes to school at age 7 and also has two years of professional training after 11 years of compulsory education then the labour market is entered at the age of 21. In the estimation it is assumed that the retirement age is 60 for men and 55 for women, the current official retirement ages for workers in China. For simplicity, the life expectancy is allowed to be the same for both sexes - 18 years at 60.

The minimum length of saving allowed is 5 years. This means that male workers over 56 and female workers over 51 are not able to save in a pension scheme or bank account. The maximum term of contribution to a pension fund is 30 years as individuals for various reasons may not remain within one pension scheme for long. For example, some workers may stop contributing to pension schemes due to maternity, caring for a child or the old or sickness. The same term of investment through bank saving will be assumed for comparative purposes.

After 5-30 years of contribution, the accumulated income in a pension fund or bank account will continue to accumulate until the saver reaches his/her retirement at age 60/55. For comparative purposes, it is assumed that on retirement all savings made through the pension fund and bank account are used to purchase annuities[51] with the exception that under the EEt model 25 percent of accumulated funds is taken as a tax-free lump-sum at retirement while the remaining amount is used to purchase annuities.[52]

It is assumed that the year of the creation of the private retirement saving plan is 2010 when the old-age dependency ratio, i.e. the population of 65+ to the population between 14 and 64, begins to increase (see Figure 2-1 in Chapter 2). According to the assumptions set above, the saving plan ceases its operation in 2067 when the youngest

[51] Annuity is calculated by using the following equation:

$$\text{Annuity} = \text{Value of accumulated savings at retirement} \times \frac{1}{\sum_{i=1}^{n} \frac{1}{(1+r)^i}}$$

Where: i is interest rate on savings and n is number of years that annuity is paid from the year of retirement until death. In this estimation, n is 18 years for men whilst 23 years for women as women retire 5-years earlier than men.

[52] The estimation assumes that the tax-free lump sum will be consumed immediately (on a holiday for example). In reality, individuals may invest part of it in a bank or other financial asset such as government

plan members (21 years old) at the year of the creation of the saving plan reach the end of their lives (the size of covered population is assumed static). Therefore, the whole time period for the estimation in this chapter is between 2010 and 2067.

The estimation assumes that the initial gross wage is 18,833 Yuan for all individual workers in year 2010. This wage level is calculated on a wage base of 7,479 Yuan with a growth rate of 8 percent per year for 12 years. The 7,479 Yuan was the level of annual average wage of the urban employees in China in 1998 (Chain Statistics Year Book, 1999 version). Between 1982 and 1996 the average money wage grew at an annual rate of 15.2 percent.[53] This was associated with high economic growth which was attributed to the "high level of capital formulation and the large opportunities in China for technological catch-up with more advanced countries" (World Bank, 1996: 147). According to the World Bank, the economic growth will come down in the longer term due to a declining savings rate and smaller scope for technological catch-up, although it may remain high for several years. An 8 percent growth rate of money wage is therefore reasonable for the estimation period between 2010 and 2067. To simplify the calculation, it is assumed that the pension scheme is a defined contribution type. This enables the contribution rate, namely 10 percent of total wage, to be fixed over the term of individuals' membership.

In order to examine the pure tax effect, the same rate of return must be used to compare the tax revenues that would be collected from the pension fund with those from the bench mark bank account. In reality pension fund returns are not the same as bank interest rates. Between 1982 and 1996 the average nominal yield on long-term government bonds in China was 10 percent[54] while the interest rate on a 5-year term bank saving was about 3 percent. Therefore, the different accrual rates used in the estimation, namely 10 percent for pension funds and 3 percent for bank savings, will provide more realistic indications of the revenues as well as the cost of the tax privileges than would the same rate of return on both accounts.

bonds and shares. Therefore, the actual tax revenue under the EEt model may be a little higher than the figures obtained later in this chapter.

[53] Table 3-11 in Chapter 3.

[54] Based on Table 3-9 in Chapter 3.

Pension fund returns are subject to 33 percent corporation income tax while bank interests are taxed at 20 percent[55]. Therefore, the estimated cost of tax privileges to private pensions incorporates both differential rates of return on accrued fund incomes and differential tax treatments on pensions and bank savings. In order to compare the effect of changes in personal income tax rates on tax cost the estimation will be calculated not only with the same personal income tax rates before and after retirement but also with different tax rates of 20 percent during working life and 5 percent in retirement.

Finally, the estimation requires an annual population distribution by age and gender, which depends on assumptions about age-specific fertility, mortality etc.. The cost estimation uses the population projections made in the United Nations publication, *Long-Range World Population Projections: Based on the 1998 Revision* (The United Nations, 2000). This long-range projection provides projected populations for the world and its major areas including China over the period 1950-2150. The projected populations are based on five-year projection intervals. Figures of age group 21-56 between the intervals are obtained by interpolation.

The estimation assumes that the private pension scheme covers a non-agricultural labour force aged between 21 and 56. This means the scheme membership includes not only employees in urban units but also employees in Individual and Private Enterprises (IEs and PEs), employees in Township and Village Enterprises (TVEs) and the self-employed. The share of non-agricultural labour in the population group 21-56 depends on two variables: a) share of labour in age group 21-56; b) share of labour in non-agriculture. Firstly, in view of the fact that the government is making more effort to improve national education, it is assumed that labour force participation in population group 21-56 becomes 90 percent by 2010 and stabilises thereafter. Secondly, according to the World Bank projection, the share of labour force in non-agriculture becomes 71 percent by 2010, 83 percent by 2030 and 89.5 percent by 2050. To simplify the estimation this ratio is assumed to be 80 percent throughout the period for estimation; the share of non-agricultural labour in the population group 21-56 is constant - 72 percent throughout 2010 to 2067.

[55] These are the current tax rates in China.

6.3 Features of the Alternative Tax Models

This section assumes the scenario that the retirement saving plan (through either a private pension scheme or a bank) covers all non-agricultural sector employees aged 21-56/51 in 2010. There are no new members after that year and so the population size for estimation is static. The purpose of this assumption, as mentioned earlier, is to generate a simplified but clear characteristic of alternative tax models, with an aim of obtaining a better understanding of the analysis in the next section. Section 6.3.1 estimates the population of contributors and beneficiaries over the period of 2010 to 2067. Section 6.3.2 compares the differences and similarities of the five tax models by computing the present value of revenues raised under each. The last section 6.3.3 analyses the effect of timing on taxation.

6.3.1 Population Distributions

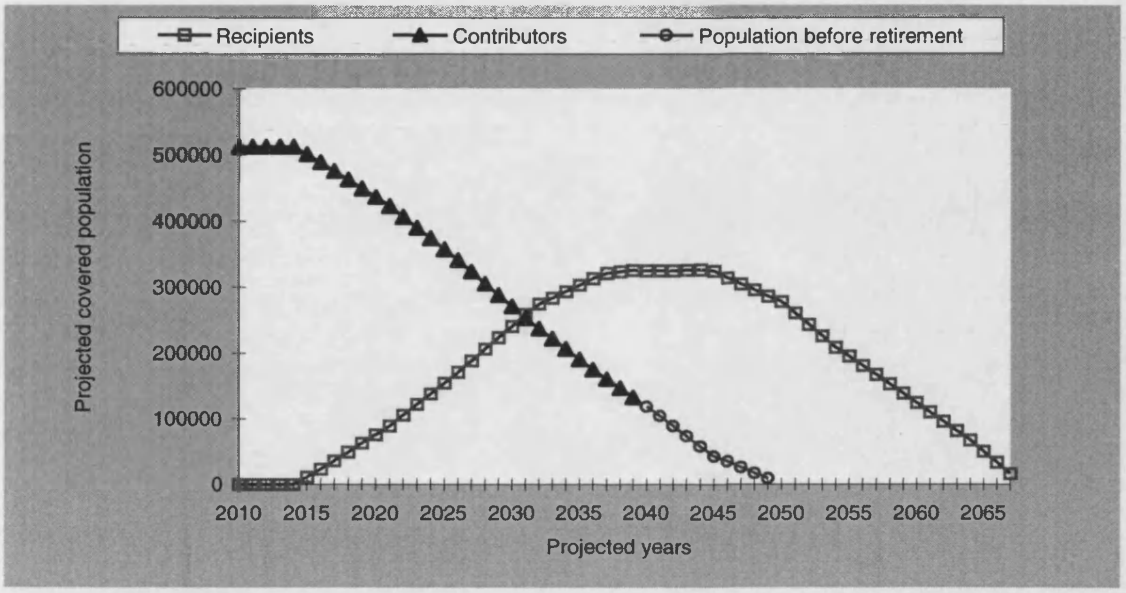
Under the assumptions stated in the last section the population distribution between contributors and beneficiaries is calculated in Figure 6-1, assuming the size of the population to be static - all non-agricultural sector employees aged from 21 to 56/51 begin to join the saving plan in 2010 and there are no new members afterwards.

As can be seen from the graph, about half a billion individuals contribute to the pension scheme (or the bank account) each year during the first five years, between 2010 and 2014. Then the number of contributors starts to decrease as those who are oldest at the commencement of the plan (51 year-old women and 56 year-old men) reach their retirement age. This figure becomes zero in 2040 as the result of the assumption that there are no new members after 2010.[56] Figure 6-1 also shows that there is no beneficiary during the first five years. After that the number of beneficiaries begins to increase for about 30 years before it starts to decrease in 2046. This figure again becomes zero by 2067 when the youngest at the time of the creation of the saving plan reach the end of their lives.

[56] Under the assumption that the maximum term of contributing to a pension fund is 30 years, there is one group of people who have completed their 30 years' of contribution but are still a few years younger than

A marked feature under this scenario is that before the year 2031 the number of contributors exceeds that of beneficiaries. However, after 2031 as more plan members reach retirement age, the number of beneficiaries exceeds the number of contributors.

Figure 6-1 Population Distribution between Contributors and Recipients
(With static size of covered population, in thousands)



6.3.2 Outcome of Revenues

The tax revenues accrued under the five tax models, i.e. EET, TEE, EEt, ETT and TTE, can be estimated using the assumptions set out in Table 6-1. The calculated revenues are based on the different tax treatments on the contributions made over the period in question, the investment returns and the annuities paid to individual savers after their retirement. Revenues from each year after the initial year of creation (namely 2010) of the saving plan are discounted to the year of creation. In other words, to make all the figures comparable, the figures are brought forward to the year of creation using the same discount rate, which is the 10 percent long-term interest rate on government bonds. The results are presented in Table 6-2.

The first part of Table 6-2 shows the present value of revenues raised under the five tax treatments on private pensions under the assumption that the personal income tax rate is

their official age of retirement. It must be noted that during this period, namely from 2040 to 2049, they do not make contributions, nor do they receive annuities.

stable throughout the individual's lifetime, 20 percent during working life and 20 percent after retirement. The figures in the table lead to three important conclusions:

First of all, the EET and the TEE models ultimately lead to the same amount of discounted revenues, whilst the ETT has the same outcomes as the TTE model. The amount of revenues in present value terms is respectively 3,269bn Yuan under the EET/ TEE and 9,536bn Yuan under the ETT/TTE. Appendix 6-1 and 6-3 provide the estimated after tax annuities to pensioners under the five tax treatments. For example, facing a 20 percent rate of income tax before and after retirement, a 21 year-old male in 2010 at retirement can receive annuities of 193,581 Yuan under the tax treatments of EET and TEE, or alternatively, 70,523 Yuan under the ETT and TTE. This means that the EET/ETT and TEE/TTE not only ultimately have the same outcome of revenue but also deliver the same outcome of benefit.

Second and equally important, in comparison with the EET and TEE models, the ETT and TTE models bring higher tax revenues to the government with the same tax rate. This indicates that the same amount of revenue can be raised by the ETT and TTE models with a lower tax rate as the tax base is larger. On the other hand, the EET and TEE reduce the size of the tax base by making all returns on savings tax-deductible. To make up the forgone revenues which would be raised under the ETT and TTE, tax rates under the EET and TEE tax models have to be higher. Thus, the ETT and TTE are more efficient in raising revenues.

Last, but not least, the EEt tax model collects the lowest revenues for the government under the same assumption. The total tax payments received by the government under this model between 2010 and 2067 are 22 percent and 73 percent lower than those under the EET/TEE and ETT/TTE models respectively. This is because the EEt model further reduces the size of the tax base by allowing 25 percent of accumulated funds to be taken away as tax-free lump sums. Although this tax treatment on the private pension scheme offers higher post-tax return to saving than any other tax models observed, it does not ultimately increase the retirement incomes of retirees if the tax-free lump sums are not used for the explicit provision of retirement income. For example, a 21 year-old male in 2010 has annuities of only 145,186 Yuan after retirement. It can be calculated that the

replacement rate (ratio of annuity to wage received in the year before retirement) for a 21 year-old male individual is 51 percent under the EET and TEE models whilst it is 38 percent under the EEt model.

Table 6-2 Total Revenues Raised under Different Tax Models

(With static size of covered population, present value, in billion Yuan)

(a) 20% rate of personal income tax during working life, 20% rate of personal income tax during retirement					
Tax models	***EET***	***TEE***	***ETT***	***TTE***	***EEt***
Initial income (Yuan)	18,833.00	18,833.00	18,833.00	18,833.00	18,833.00
Tax on contribution	0.00	3,269.13	0.00	3,269.13	0.00
Tax on return	0.00	0.00	7,833.76	6,267.00	0.00
Tax on annuity	3,269.13	0.00	1,702.37	0.00	2,556.54
Sum of tax payment	**3,269.13**	**3,269.13**	**9,536.13**	**9,536.13**	**2,556.54**
(b) 20% rate of personal income tax during working life, 5% rate of personal income tax during retirement					
Tax models	***EET***	***TEE***	***ETT***	***TTE***	***EEt***
Initial income (Yuan)	18,833.00	18,833.00	18,833.00	18,833.00	18,833.00
Tax on contribution	0.00	3,269.13	0.00	3,269.13	0.00
Tax on return	0.00	0.00	7,833.76	6,267.00	0.00
Tax on annuity	811.32	0.00	425.59	0.00	612.96
Sum of tax payment	**811.32**	**3,269.13**	**8,259.35**	**9,536.13**	**612.96**

6.3.3 Timing of Taxation

As noted, EET and TEE are equivalent in that they both obtain a post-tax rate of return on savings equal to the pre-tax rate of return on investments (Chapter 4). It has also been proved that they generate the same amount of discounted revenues. However, the two models raise revenue at different times. Revenue is deferred until retirement under EET but received immediately under TEE. With regard to ETT and TTE, they are equivalent in that they both offer a lower post-tax rate of return on saving than pre-tax rate of return and determine the same income tax base. However, they also differ somewhat in the timing of collection of tax payments.

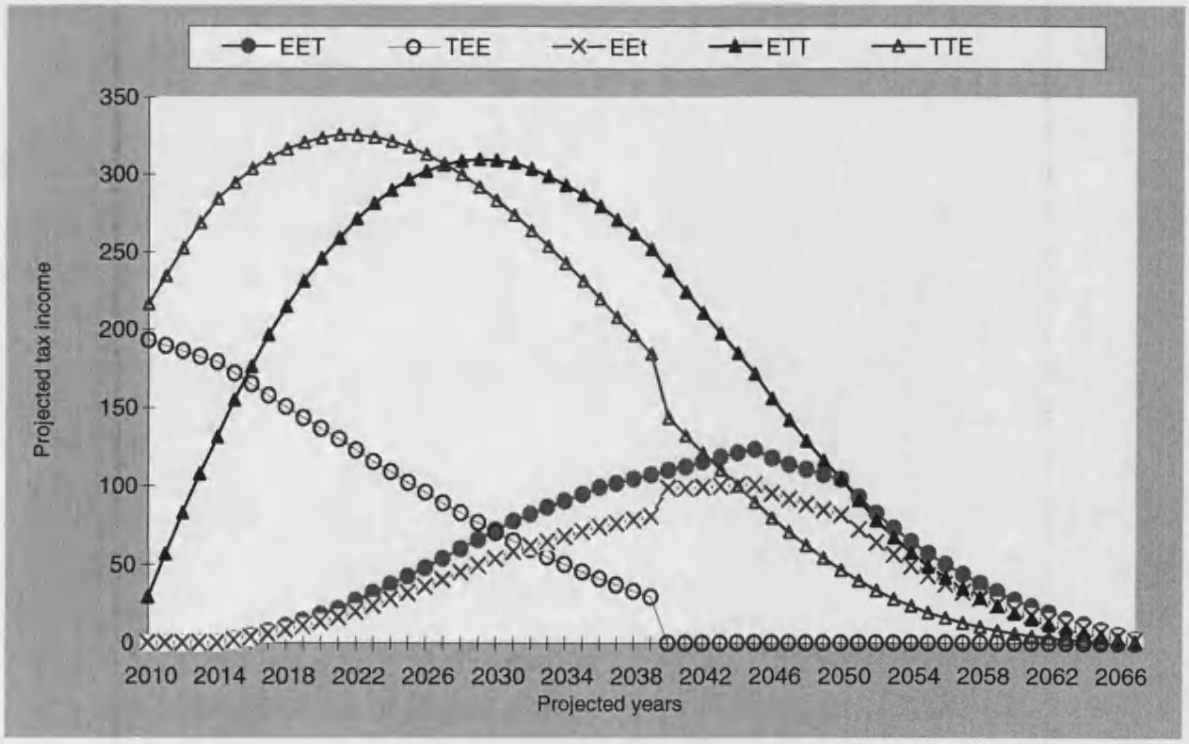
Figure 6-2 illustrates the timing of taxation and the amount of revenue raised under the five tax models. For purposes of comparison the tax revenues are calculated in present value terms. As can be seen, during the first five years from 2010 to 2014 EET does not provide the government any tax revenue. It starts to provide revenue in 2015 when the oldest members at the time of the creation of the retirement saving plan reach retirement age. Although EET provides lower revenue than TEE before 2031, it provides higher revenues thereafter. The increase in future revenues under EET is due to two factors. The first factor is the proportion of beneficiaries in the total covered population. As more plan members reach retirement age the number of beneficiaries rises over time. When the number of pension beneficiaries exceeds the number of contributors the tax base for EET is larger compared to TEE and consequently higher revenue is received by the government. The second factor which determines a higher future revenue under EET is that each successive age cohort of new beneficiaries has a larger taxable income from a longer saving period. These two factors come into play in determining the timing of when EET collects higher revenues than TEE.

When ETT and TTE are compared the two factors examined above also apply. To sum up, ETT provides lower revenue during the years following the creation of the plan but provides higher revenue in later years. TTE works the opposite way, raising present and reducing future revenues. The TEE model provides no revenue to the government after year 2040 (the number of contributors becomes zero) but TTE still brings some tax revenue due to the taxes levied on the investment income of the fund. Finally, the figure also shows that EEt and EET have the same pattern of taxation although the former collects 25 percent less revenue for the government.

The differing points at which the tax payments occur have effects on the revenue to the government as well as on retirement benefit to individual savers. If the tax rate on benefit is replaced by the tax on contributions at the same rate there is no change in the value of tax revenue or in the value of the net retirement benefit. If individuals' annual income were to fluctuate over their lifetime under a progressive tax system, then EET and TEE would no longer be equivalent, nor would ETT and TTE. If individuals' taxable income is subject to a lower income tax rate during retirement than during working years then the tax revenue raised under EET/ETT would be lower than that

raised under TEE/TTE. The second part of Table 6-2 provides the present value of revenue raised under the five tax treatments, EET, TEE, ETT, TTE and Eet, under the assumption that the personal income tax rate falls when individuals reach retirement, i.e. 20 percent during working life and 5 percent after retirement. The figure shows that as individuals' income tax rate falls, total discounted revenue under EET, ETT and EEt drops 75 percent, 13 percent and 78 percent respectively. This means that under EET, ETT and EEt there will be some loss in terms of government revenue when taxpayers' marginal tax rate is lower in retirement. However, the principal advantage of the three models to the individual saver is that when the tax is deferred the subsequent level of income tax is reduced and consequently the retirement benefit is higher. It can be calculated from the data in Appendix 6-2 and 6-4 that when the income tax rate decreases from 20 percent to 5 percent net retirement benefit received by the saver increases by 18.75 percent.

Figure 6-2 Patterns of Taxation under Different Tax Models
(With static size of covered population, present value, in billion Yuan)



6.4 Cost of Preferential Tax Treatments on Private Pensions

This section estimates tax payments and forgone revenues within the scenario that the size of covered population expands over time. In this scenario the saving plan covers not only employees aged 21-56/51 in 2010 (the covered population in the last section) but also 21 year-old new employees each year from 2011 to 2067. The first part of this section compares the discounted revenue raised under the five tax models and the second part calculates the annual cost of tax privileges to private pensions.

6.4.1 End Value of Revenues

Before comparing the tax payment collected under different tax treatments on private pensions and the forgone revenue to the government it is useful to briefly describe the population distributions between contributors and beneficiaries throughout the period of 2010 to 2067 which play an important role in the timing of taxation, as stressed in the last section.

The population distributions between contributors and pensioners (in either a pension fund or a bank account) over the period of 2010 to 2067 are displayed in Figure 6-3. As mentioned at the beginning of this section, the total pension members here include employees aged 21-56/51 in the year of 2010 and new employees aged 21 after that year. In order to examine the effect of population distribution on tax revenues raised under each tax model, the total population between 2010 and 2067 is divided into two groups. The first group contains those who join the saving plan in 2010 (which is the population size for the last section) and the second group includes those who join the plan after 2010. While curves C_1 and P_1 represent respectively changes in the numbers of contributors and beneficiaries in the first group, curves C_2 and P_2 represent respectively changes in the numbers of contributors and beneficiaries in the second group. As the figure shows, changes in the numbers of contributors and beneficiaries within the first group have the expected result - more contributors than recipients before the year of 2031 and vice versa after 2031. However, within the second group there are no recipients before the year of 2046.

The population effect of the first saving group on the timing of revenues has been analysed in the previous section. As that section says, if the size of covered population is static, the amount of revenue raised each year under different tax treatments depends on two factors - the share of contributors and beneficiaries in total covered population and the amount of taxable incomes of taxpayers. EET/ETT determines a smaller tax base in comparison with TEE/TTE during the early years following the creation of the plan. This is because there are more contributors than beneficiaries during this period and also the early-retired members have smaller taxable incomes because of a shorter saving period. However, EET/ETT determine a larger tax base in later years when the number of pension beneficiaries exceeds the number of contributors, also, the later retired members have larger taxable incomes because of the longer saving period. Nevertheless, when the plan has matured the end values under EET/ETT and TEE/TTE are the same. It must be noted that the length of time for a saving plan to mature after its creation depends on three factors - age of the youngest at the time of creation of the plan, eligible age for benefit and life expectancy. For example, under the assumption set up in this chapter the process for plan maturation takes 58 years (61-21+18). This means that the plan has matured by 2067 when the 21 year-old cohort, the youngest at the time of creation of the plan, reaches life end.

As regards the population effect of the second saving group, individuals' taxable income ceases to play a role in distinguishing the tax base of EET/EET from that of TEE/TTE because the taxable incomes of new beneficiaries are the same. The only factor which affects the amount of tax revenue under the different tax models is the share of contributors and beneficiaries in the total covered population. As its membership increases each year, each successive expansion in coverage brings new group of members into the plan, increasing the number of contributors and only later increasing the number of beneficiaries. Therefore, the saving plan would take longer to mature as each new cohort of covered population (21 year-old) sets off a new maturation process. In view of the fact that during 2010 to 2067 there are more individuals contributing than receiving benefits (as new members entering the plan after 2033 (female) and 2028 (male) are under retirement age) the discounted revenue under EET/ETT is much lower than that under TEE/TTE (see Figure 6-4 and 6-5).

Table 6-3 presents the discounted revenue under the five tax models including the total covered population, i.e. the two saving groups, while the pattern of timing on taxation is illustrated in Figure 6-6. It can be seen from Table 6-3 that between 2010 and 2067 TTE provides the highest discounted revenue followed by ETT. TEE provides lower discounted revenue than ETT but higher than EET. As expected, EEt provides the lowest revenue. It must be noted that if covered population after 2068 is stable in size, the long-term effect of EET/ETT and TEE/TTE are the same as long as the income tax rate during retirement does not differ from that during working period. Thus one can expect that in Figure 6-6 the discounted revenue line for EET/ETT will converge with that for TEE/TTE to be horizontal. However, if the rate of coverage after 2068 is zero then the plan will be mature by 2125. In this case one can expect that the TEE/TTE curve will decline immediately while the EET/ETT curve will decline later.

Figure 6-3 Population Distribution between Contributors and Recipients
(With expanding size of covered population, in thousands)

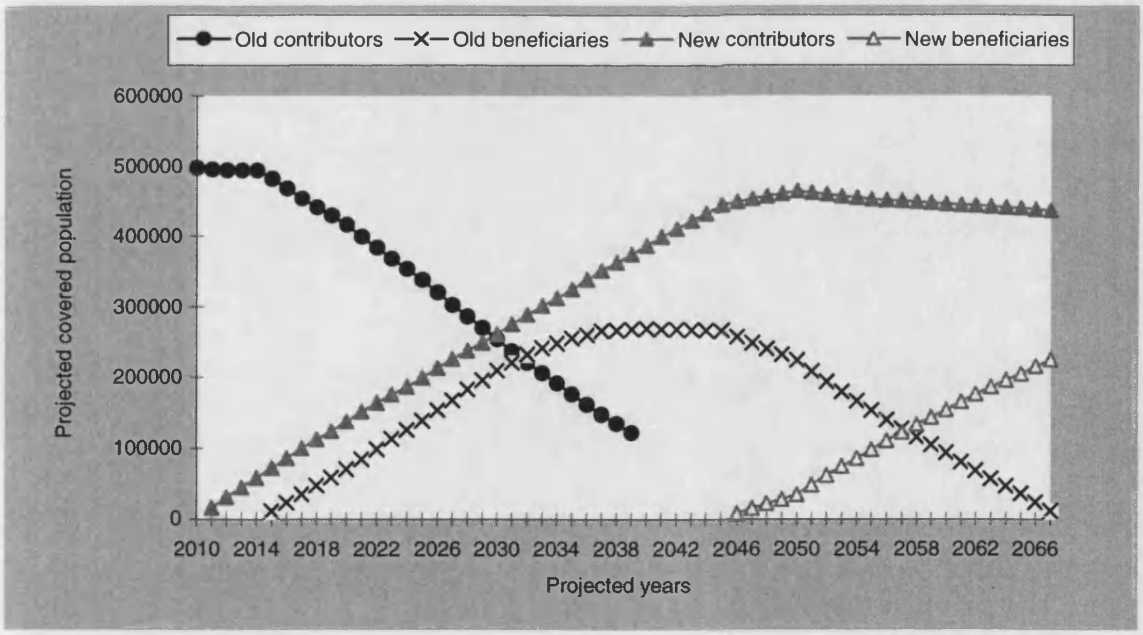


Figure 6-4 Revenues from the Second Saving Group under EET and TEE
(Present value, in billion Yuan)

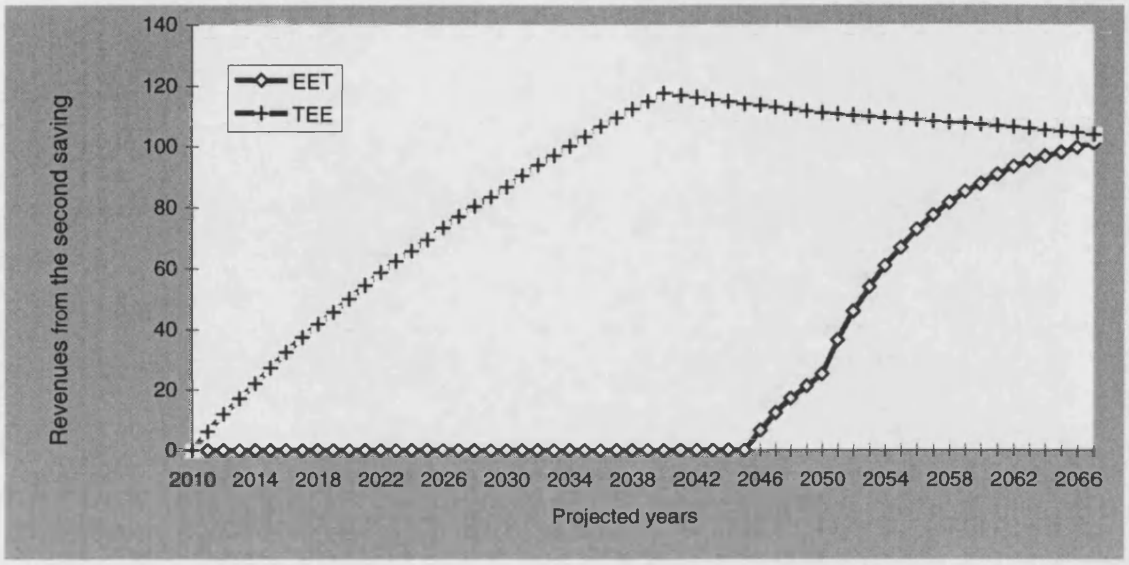


Figure 6-5 Revenues from the Second Saving Group under ETT and TTE
(Present value, in billion Yuan)

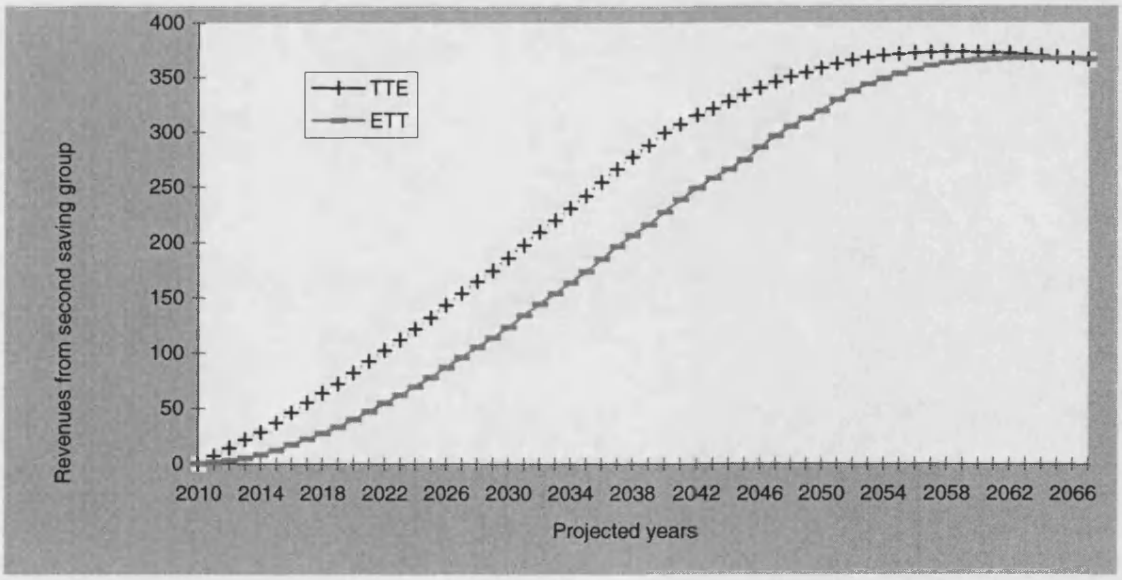
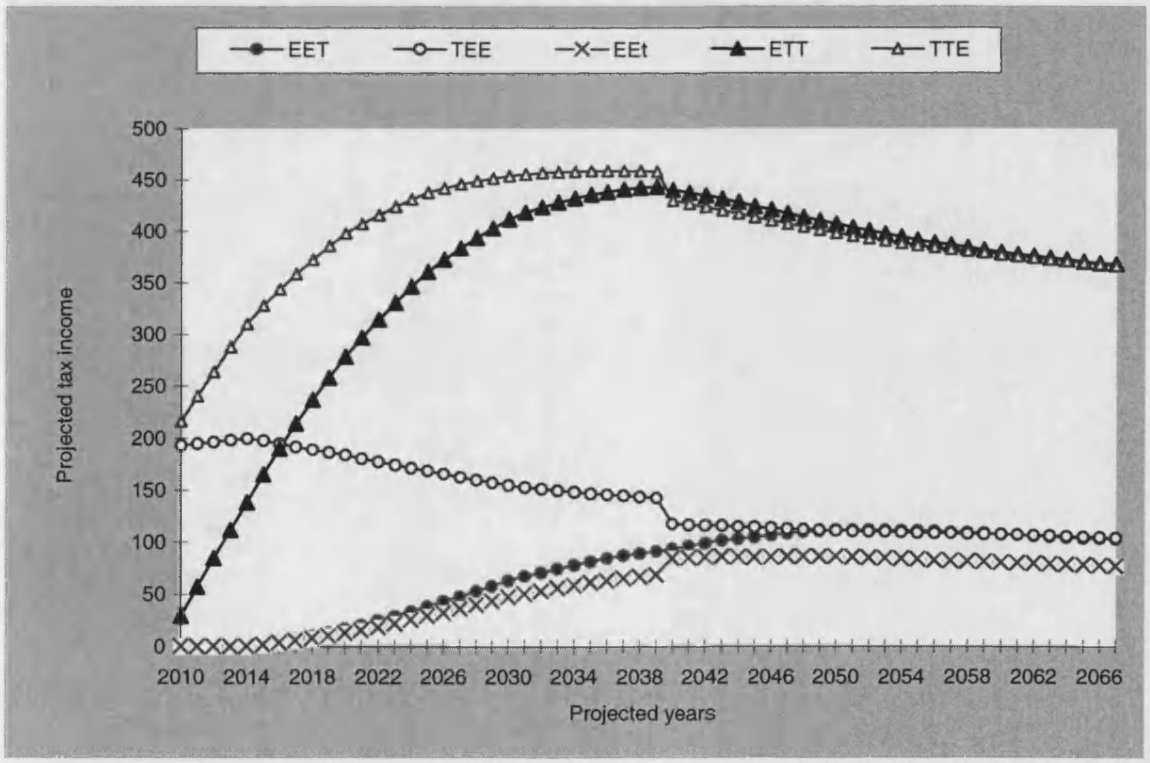


Table 6-3 Total Revenues Raised under Different Tax Models
(With expanding size of covered population, present value, in billion Yuan)

(a) 20% rate of personal income tax during working life, 20% rate of personal income tax during retirement					
Tax models	***EET***	***TEE***	***ETT***	***TTE***	***EEt***
Tax on contributions	0.00	8,209.92	0.00	8209.92	0.00
Tax on investment	0.00	0.00	18481.57	14785.26	0.00
Tax on benefits	4,170.05	0.00	1985.08	0.00	3,216.02
Sum of tax payment	**4,170.05**	**8,209.92**	**20,466.65**	**22,995.18**	**3,216.02**
(b) 20% rate of personal income tax during working life, 5% rate of personal income tax during retirement					
Tax models	***EET***	***TEE***	***ETT***	***TTE***	***EEt***
Tax on contributions	0.00	8,209.92	0.00	8209.92	0.00
Tax on investment	0.00	0.00	18481.57	14785.26	0.00
Tax on benefits	1037.27	0.00	496.27	0.00	3,216.02
Sum of tax payment	**1037.27**	**8,209.92**	**18977.84**	**22,995.18**	**3,216.02**

Figure 6-6 Patterns of Taxation under Different Tax Models
(With expanding size of covered populations, present value, in billion Yuan)



6.4.2 Cost estimates with respect to the Chosen Benchmark Tax Treatment

Using the assumptions stated in Table 6-1, the cost to the government in terms of forgone revenues is calculated using the tax treatment on bank saving TtE as a benchmark. The cost of tax privileges to private pensions is calculated by subtracting the revenue received by the government under the five tax treatments, i.e. EET, TEE, ETT, TTE and EET, from the revenue received under bank savings, i.e. TtE. For example, supposing that tax revenues raised under EET, TTE and TtE are 2bn, 5bn and 4bn Yuan respectively, then EET would have a cost of 2bn Yuan to the government, while TTE would have a negative cost of 1bn Yuan. To compare the effect of a change to the income tax rate on revenues, the estimation provides the results under two assumptions. First, individuals' income tax rate is stable throughout their lifetime - 20 percent before and after retirement. Second, income tax rate during retirement differs from that during the working period - 20 percent at work while 5 percent during retirement. Total costs in present value terms are shown in Table 6-4; figures for annual costs are displayed in Table 6-5 and 6-6.

Part 1 of Table 6-4 presents the discounted tax revenues under TtE. The figure of 8,209.92bn Yuan is tax revenue collected from contributions to bank accounts and 1,799.38bn Yuan is revenue from bank interests giving total discounted revenue of 10,009.31bn Yuan under bank savings. When these figures are subtracted by those in Table 6-3 item by item, the cost under private pensions can be obtained and presented in Part 2 of Table 6-4. Therefore, the figure in Table 6-4 incorporates the tax treatment of contributions, investment earnings and retirement benefits on pensions which are deviations from those on bank savings.

The figure shows that under the TTE model the government gains 12,985.88bn Yuan because fund investment earnings (subject to 33 percent) are taxed more heavily than bank interests (subject to 20 percent). Under the ETT model the more revenue raised from fund investment earnings partly offsets the cost of 8,209.92bn Yuan on contributions paid to the fund, therefore the government gains slightly less revenues - 10,457.34bn Yuan during the same period. Under the EET and TEE models, the cost to the government in terms of forgone revenues occurs due to the exemptions on

investment returns. The total costs between 2010 and 2067 are 5,839.26bn and 1,799.38bn Yuan respectively. In view of the fact that the plan is not yet mature during the period for estimation, EET results in higher cost than TEE.[57] Amongst the five tax models, the EEt model has the highest cost to the government with a total revenue loss of 9227.43bn Yuan. This is because lump sums are not included in the tax-base of personal income when pensions are paid out, also, contributions and investment incomes are tax-free. Again, the cost to the government increases under the EET, ETT and EEt models when individuals' marginal tax rate decreases from 20 percent to 5 percent after retirement. This indicates that as tax revenues deferring from a period when taxpayers are subject to a higher tax rate to one when subject to a lower tax rate, the cost to the government increases and is shown in a reduction in future revenues.

Next to Table 6-5. When the system begins to function EET systematically raises less revenue than TtE (tax model on bank savings). It is not until 2038 that revenue under EET exceeds revenues under TtE. From then on the revenue increases each year until 2067, thus the cost is shown negative for 30 years. In comparison to EET, EEt has the same amount of cost for the first five years. It has higher cost than EET from 2014 when the oldest members reach retirement age and is not until 2040 that the cost becomes negative. Also, the negative cost is lower than that of EET. When TEE is examined, unlike EET which has cost in the early years but negative cost in later years, TEE systematically has positive cost throughout the time span from 2010 to 2067, although TEE provides higher present value of revenues. As regards TTE and ETT, the cost under the former is negative during the 58 years whereas under the latter it is positive in the first six years until it becomes negative from 2017. Again, Table 6-6 shows that the cost to the government increases under EET, ETT and EEt when individuals' marginal tax rate decreases from 20 percent to 5 percent after retirement.

Finally, the reliability of the estimates has to be analysed. **First**, in the estimation the private retirement saving plan is assumed to cover the whole of the non-agricultural sector employees aged 21-56. This rate of coverage is obviously far too high. For example, if the rate of coverage in age group 21-56 is 30 percent, then all the estimates

[57] The estimation also takes account of mortality of the covered population. This means that contribution tax receives higher revenues in present value terms than benefit tax even when saving plans have matured.

of revenues as well as costs produced in this chapter can be decreased by 42 percent. **Second,** for comparative purposes, revenues estimated under the pension scheme and the bank saving plan are discounted at 10 percent. Therefore, the present value of tax revenue from bank savings is reduced as bank savings accrue 3 percent per year under the assumption set up in Table 6-1. This means the cost is underestimated. When revenues from bank savings are discounted at 3 percent the relative cost to the government under the EET tax model increases from 5,839.26bn to 23,319.13bn if individuals' income tax rates stay unchanged. **Third,** the estimation does not take account of employer contributions. Under the current regulation 5 percent of employer contributions to complementary pension schemes are deducted from the tax base as business expenses. However, fund returns and pensions are taxed. Therefore employer contributions are taxed under an ETT model. If ETT or TTE are applied in China employer contributions will have zero cost to the government. If, on the other hand, the EET or TEE model were applied, there would be some cost resulting from tax exemption on fund investment returns. **Finally,** the cost is only estimated assuming an investment term of 30 years. One can expect that as the term increases the cost to the government decreases as the longer period enables a higher taxable pension to be accrued.

Table 6-4 Cost on Pensions with Tax Treatment on Bank Savings as Benchmark

(With expanding size of covered population, present value, in billion Yuan)

Part 1

Tax revenues under the tax treatment on bank savings, TtE, in present value terms

Tax on contributions = 8,209.92
Tax on bank interests = 1,799.38
Tax on benefits = 0.00
Total tax revenues = 10,009.31

Part 2: Obtained by subtracting figures in Table 6-3 from figures in Part 1.

(a) 20% rate of income tax during working life, 20% rate of income tax during retirement

Tax models	***EET***	***TEE***	***ETT***	***TTE***	***EEt***
Cost on contributions	8,209.92	0.00	8,209.92	0.00	8,209.92
Cost on investment	1,799.38	1,799.38	- 16,682.19	- 12,985.88	1,799.38
Cost on benefits	- 4,170.05	0.00	- 1,985.08	0.00	- 3,216.02
Total cost	**5,839.26**	**1,799.38**	**- 10,457.34**	**- 12,985.88**	**6,793.29**

(b) 20% rate of income tax during working life, 5% rate of income tax during retirement

Tax models	***EET***	***TEE***	***ETT***	***TTE***	***EEt***
Cost on contributions	8,209.92	0.00	8,209.92	0.00	8,209.92
Cost on investment	1,799.38	1,799.38	- 16,682.19	- 12,985.88	1,799.38
Cost on benefits	- 1,037.27	0.00	- 496.27	0.00	- 781.88
Total cost	**8,972.04**	**1,799.38**	**- 8,968.53**	**- 12,985.88**	**9,227.43**

Table 6-5 Annual Cost on Private Pensions with respect to Bank Savings

(20% tax rate during working, 20% tax rate after retirement, in billion Yuan)

Year	EET	TEE	EEt	ETT	TTE
2010	197,76	4,63	197,76	165,89	-20,86
2011	223,40	9,84	223,40	154,36	-45,39
2012	251,51	15,71	251,51	139,18	-74,16
2013	282,41	22,31	282,41	119,75	-107,82
2014	315,39	29,65	315,39	95,06	-146,61
2015	341,49	37,72	342,43	56,95	-190,78
2016	366,38	46,27	368,61	12,06	-239,27
2017	391,45	55,54	395,38	-40,10	-293,46
2018	416,55	65,58	422,67	-100,39	-353,95
2019	442,11	76,37	450,82	-168,52	-420,87
2020	467,37	88,00	479,29	-246,12	-495,02
2021	487,05	99,95	503,20	-333,60	-573,53
2022	504,58	112,71	525,93	-432,05	-659,55
2023	519,42	126,35	547,11	-542,69	-753,81
2024	531,69	140,86	566,87	-665,60	-856,59
2025	540,00	156,33	584,15	-802,58	-968,61
2026	541,15	171,67	595,57	-947,33	-1.083,15
2027	536,00	187,80	602,60	-1.106,69	-1.206,31
2028	523,48	204,80	604,45	-1.282,10	-1.338,83
2029	503,22	222,66	600,87	-1.474,00	-1.481,13
2030	472,94	241,39	590,07	-1.684,07	-1.633,48
2031	444,41	259,89	580,90	-1.893,72	-1.787,66
2032	405,78	279,02	564,36	-2.119,46	-1.950,45
2033	356,82	298,85	540,32	-2.361,77	-2.122,42
2034	295,89	319,43	507,57	-2.622,31	-2.304,26
2035	220,56	340,65	464,19	-2.901,49	-2.495,33
2036	142,86	362,03	419,43	-3.185,23	-2.691,15
2037	50,05	383,83	363,37	-3.485,40	-2.894,54
2038	-58,00	406,09	295,93	-3.802,05	-3.105,90
2039	-183,88	428,85	215,21	-4.137,20	-3.325,82
2040	-825,51	382,05	-652,45	-4.915,19	-3.566,49
2041	-1.061,07	392,20	-821,85	-5.254,10	-3.744,16
2042	-1.319,19	401,66	-1.007,40	-5.595,60	-3.919,56
2043	-1.601,51	410,37	-1.210,27	-5.939,12	-4.092,31
2044	-1.909,78	418,25	-1.414,91	-6.284,00	-4.262,02
2045	-2.246,68	425,33	-1.646,88	-6.629,00	-4.427,24
2046	-2.605,91	432,82	-1.904,87	-6.956,82	-4.573,68
2047	-2.981,52	439,69	-2.173,90	-7.277,25	-4.712,51
2048	-3.376,37	445,91	-2.455,98	-7.590,60	-4.843,86
2049	-3.793,59	451,46	-2.734,09	-7.897,26	-4.967,93
2050	-4.234,91	456,89	-3.043,72	-8.196,07	-5.083,46
2051	-4.614,77	461,00	-3.312,11	-8.441,57	-5.174,39
2052	-4.978,49	464,39	-3.566,56	-8.666,32	-5.254,30
2053	-5.328,29	467,10	-3.808,51	-8.872,05	-5.324,38
2054	-5.666,72	469,16	-4.031,13	-9.060,59	-5.385,92
2055	-5.994,27	470,73	-4.255,73	-9.233,32	-5.439,78
2056	-6.268,67	471,17	-4.440,08	-9.366,98	-5.476,36
2057	-6.523,29	471,13	-4.607,02	-9.480,61	-5.503,11
2058	-6.759,82	470,67	-4.816,73	-9.576,01	-5.521,31
2059	-6.982,43	469,86	-4.984,14	-9.656,83	-5.532,41
2060	-7.193,40	468,80	-5.142,88	-9.725,44	-5.537,69
2061	-7.341,25	467,00	-5.254,97	-9.761,27	-5.534,41
2062	-7.462,08	464,95	-5.346,85	-9.779,10	-5.523,91
2063	-7.556,38	462,69	-5.418,90	-9.780,51	-5.507,41
2064	-7.627,48	460,28	-5.473,58	-9.769,23	-5.486,25
2065	-7.678,86	457,77	-5.513,49	-9.748,00	-5.461,83
2066	-7.685,87	455,83	-5.520,11	-9.720,85	-5.443,77
2067	-7.656,94	453,82	-5.499,78	-9.681,04	-5.423,42
Accumulated cost	**-128.745,21**	**17.758**	**-86.657,12**	**-268.445,98**	**-176.344,57**

Table 6-6 Annual Cost on Private Pensions with respect to Bank Savings
(20% tax rate during working, 5% tax rate after retirement, in billion Yuan)

Year	EET	TEE	EEt	ETT	TTE
2010	197,76	4,63	197,76	165,89	-20,86
2011	223,40	9,84	223,40	154,36	-45,39
2012	251,51	15,71	251,51	139,18	-74,16
2013	282,41	22,31	282,41	119,75	-107,82
2014	315,39	29,65	315,39	95,06	-146,61
2015	344,33	37,72	344,56	58,98	-190,78
2016	373,08	46,27	373,64	16,81	-239,27
2017	403,25	55,54	404,23	-31,82	-293,46
2018	434,91	65,58	436,44	-87,63	-353,95
2019	468,24	76,37	470,42	-150,57	-420,87
2020	503,12	88,00	506,10	-221,83	-495,02
2021	535,49	99,95	539,52	-301,06	-573,53
2022	568,62	112,71	573,96	-389,53	-659,55
2023	602,50	126,35	609,43	-488,17	-753,81
2024	637,23	140,86	646,02	-597,21	-856,59
2025	672,43	156,33	683,46	-717,85	-968,61
2026	707,38	171,67	718,02	-844,09	-1.083,15
2027	738,74	187,80	752,46	-981,85	-1.206,31
2028	769,31	204,80	786,65	-1.132,14	-1.338,83
2029	798,95	222,66	820,57	-1.295,45	-1.481,13
2030	827,23	241,39	853,62	-1.472,61	-1.633,48
2031	856,74	259,89	887,99	-1.650,24	-1.787,66
2032	884,37	279,02	921,17	-1.839,92	-1.950,45
2033	910,13	298,85	953,19	-2.042,28	-2.122,42
2034	933,59	319,43	983,87	-2.258,31	-2.304,26
2035	954,19	340,65	1.012,35	-2.487,79	-2.495,33
2036	975,27	362,03	1.041,69	-2.721,83	-2.691,15
2037	992,70	383,83	1.068,33	-2.967,34	-2.894,54
2038	1.006,48	406,09	1.092,29	-3.224,69	-3.105,90
2039	1.015,81	428,85	1.113,16	-3.494,94	-3.325,82
2040	524,74	382,05	634,54	-4.201,95	-3.566,49
2041	469,47	392,20	594,31	-4.459,11	-3.744,16
2042	408,05	401,66	549,30	-4.714,68	-3.919,56
2043	340,01	410,37	499,14	-4.968,11	-4.092,31
2044	264,52	418,25	443,44	-5.218,88	-4.262,02
2045	181,71	425,33	381,72	-5.465,32	-4.427,24
2046	95,39	432,82	318,15	-5.688,10	-4.573,68
2047	4,49	439,69	251,00	-5.901,77	-4.712,51
2048	-93,83	445,91	179,72	-6.106,54	-4.843,86
2049	-196,09	451,46	103,70	-6.302,69	-4.967,93
2050	-304,48	456,89	23,06	-6.488,85	-5.083,46
2051	-396,94	461,00	-45,46	-6.636,82	-5.174,39
2052	-485,91	464,39	-111,53	-6.769,14	-5.254,30
2053	-571,92	467,10	-175,55	-6.887,36	-5.324,38
2054	-655,56	469,16	-237,96	-6.993,16	-5.385,92
2055	-736,85	470,73	-298,73	-7.087,72	-5.439,78
2056	-805,87	471,17	-350,64	-7.156,26	-5.476,36
2057	-870,31	471,13	-399,23	-7.210,49	-5.503,11
2058	-930,54	470,67	-444,76	-7.252,07	-5.521,31
2059	-987,55	469,86	-487,98	-7.283,27	-5.532,41
2060	-1.041,84	468,80	-529,21	-7.305,94	-5.537,69
2061	-1.082,41	467,00	-560,84	-7.313,74	-5.534,41
2062	-1.116,41	464,95	-587,61	-7.310,22	-5.523,91
2063	-1.143,94	462,69	-609,57	-7.296,94	-5.507,41
2064	-1.165,78	460,28	-627,30	-7.276,08	-5.486,25
2065	-1.182,76	457,77	-641,41	-7.249,67	-5.461,83
2066	-1.188,57	455,83	-647,13	-7.228,19	-5.443,77
2067	-1.185,46	453,82	-646,17	-7.201,39	-5.423,42
Accumulated cost	**5.330**	**17.758**	**16.441**	**-211.623,58**	**-176.344,57**

6.5 Conclusion

Tax incentives are economically equivalent to public expenditure and should be included in fiscal consideration. This chapter has compared the different tax treatments on private pensions - EET, TEE, ETT, TTE and Eet - by estimating their tax revenues and relative costs between 2010 and 2067 with respect to the benchmark TtE which is the tax treatment on bank savings in China.

In order to achieve an easier understanding of the five tax models the estimation is conducted within two scenarios, i.e. the size of covered population is static and the size of covered population expands over time from 2010 to 2067. In the first scenario EET and TEE have the same present value of tax revenue, as have ETT and TTE. The EEt model produces the lowest revenue to the government because it allows both investment income and pension benefits to be tax exempt. However, the revenue decreases under EET, ETT and EEt when individuals' marginal tax rates decrease from 20 percent to 5 percent after retirement.

If the size of covered population expands over time from 2010 to 2067, the estimated results differ from those in the first scenario. When ETT and TTE are compared there are two differences between these two models. First, the former generates higher present value of tax revenue that the latter. This is because during the period for estimation there are more contributors in the scheme producing a larger base for tax purposes under the TTE model than that under the ETT. Second, although the total costs under the two models are all negative, 12,985.88bn Yuan and 10,457.34bn Yuan respectively, resulting from the higher tax rate on fund returns than that on bank interests, they show different patterns annually. The annual cost under the former is systematically negative during the 58 years, whereas under the latter it is positive for six years before it becomes negative from 2017. There are also two differences between the EET and TEE models. First, EET has a lower present value of tax revenue than TEE during the estimation period. Consequently, the cost to the government in terms of forgone revenues under the former is higher than that under the latter, 5,839.26bn Yuan versus 1,799.38bn Yuan. Second, unlike EET which has positive cost in the early years and negative cost in later years, TEE systematically has positive cost throughout the time span from 2010 to 2067.

VII. SUMMARY AND POLICY IMPLICATIONS

The objective of this chapter is to summarise this thesis and provide some suggestions as to what policies should be implemented in China. Section 7.1 recaps on the main analysis and findings in the previous chapters. To encourage individuals to save for their retirement, Section 7.2 draws some conclusions for future policy mainly concerning the tax arrangements on private pensions. Section 7.3 addresses potential problems connected of with regard to the recommended tax treatment on pension funds and gives some alternative solutions. The last section highlights some important issues that have not been considered and need further research.

7.1 Summaries of the Thesis

Following a review of the development of the public pension system in China, Chapter 2 investigates the central issues of the current public provision for retirement income. The increasing contribution rate made necessary by the ageing population and higher dependency ratio will be a large burden for enterprises: it hinders their restructuring and damages national economic growth. Although design changes within the existing system, such as extension of coverage, indexation to prices, reduction in replacement rates and increase of retirement age, can improve the financial viability of the system in the short or middle term, the current system is not financially viable over the long term. The thesis suggests that one of the solutions to this problem in China is to reduce state pension provision by promoting private pension schemes. This is to say that a portion of old age security must instead be provided by self-insurance or occupational pensions. People especially high-income earners, must save for themselves, shifting consumption from their younger productive years to their older years when consumption exceeds income.

Chapter 3 discusses the respective roles of a pay-as-you-go public pension provision and a funded private pension arrangement and how they could be integrated. The first advantage of a pay-as-you-go public system is its ability to finance benefits rests on the entire economy thus giving the public system a financial security not easily matched by

private plans. The second advantage is its provision for social solidarity and protection against the risk of personal misfortune. It provides a broad array of benefits besides retirement benefits such as pensions for widows and disabled and their independents, which are absent in a private plan. The third advantage is its ability to redistribute income from the rich to the poor: the benefit formula can, for instance, weight the benefits in favour of the low-paid workers. Finally, a pay-as-you-go public system also assures workers that their protection will follow them when they change jobs, this is not always found in private plans. However, a funded private system is also seen as having several advantages over a pay-as-you-go public system. For one, it avoids the problems of financing such a scheme resulting from an aging population. It also provides welcome funds for capital development and investment. Moreover, it gives individuals higher incentive to save due to a stronger linkage between contributions and retirement benefits. Finally, it is able to offer individuals higher rates of return on saving when the growth rates of both wage and economically active population are slowing down while the financial market is booming.

In China, a pension mix with pay-as-you-go based public provisions and funded private arrangements would benefit both individuals and the national economy. First, on one hand, the public system provides a safety net of retirement insurance for the old, low-income earners, part-time female workers, and those who have to leave the labour market due to disability. Private pension plans, on the other hand, would satisfy the requirement from high-income earners to maintain (or increase) their standard of living after retirement. Second, a mix would give individuals more flexibility over their decisions on retirement saving and more freedom to choose between the two schemes. A diversification across differing retirement arrangements, financing mechanisms and portfolio management can protect individuals against exposure to extreme failure of any one retirement arrangement and portfolio management, reducing overall risk and maximising returns to pensioners. Third, the heavy pension contribution burden on enterprises is reduced by the individual taking on part of the responsibility for retirement provision: a lower rate of contribution from enterprises, State-Owned Enterprises in particular, would help to facilitate and accelerate their reform and restructuring. Fourth, a mix offers a better balance of burden-sharing between the government, enterprises and individuals, thus reducing public expenditure on caring for the old in the long term.

Chapter 4 studies the tax treatments of private pensions in 20 OECD countries. According to the Andrew Dilnot taxonomy in 1992, the tax treatments of private pensions in 20 observed member countries of the OECD fall into five categories: ETT, TTE, EET, TEE and EEt. Under the first two models, returns to pension funds are taxed and either contributions (TTE) or pensions (ETT) are also taxed. Nations following this pattern include New Zealand, Denmark, Sweden, Japan and Belgium (for self-administered funds). Under the third and fourth models, either contributions (TEE) or pension benefits (EET) are taxed while fund investments are not. However, the EET model is the common regime in the majority of OECD countries such as Finland, France, Germany (for book-reserve financing), Iceland, Italy, Luxembourg, Norway, and Portugal. The last model, EEt, taxes pension savings the same way as the EET model except for a further exemption of 25 percent of lump sum payment on retirement. Examples of this model are the United Kingdom and Ireland.

Theoretically, the ETT and TTE models are equivalent to an Income Tax system in which all types of incomes are taxed whether saved or consumed. However, this system taxes savings more heavily than consumption because the post-tax rate of return on saving is lower than pre-tax rate of return. Therefore, these two models are seen as discouraging saving behaviour, more precisely, saving for retirement. On the other hand, the EET and TEE tax models are equivalent to an Expenditure Tax system. This system taxes pension saving on a consumption-tax basis by either allowing pension contributions and fund returns to be deductible from the income tax liability while subjecting the pension benefit to tax, or taxing only contributions while leaving pension benefits and fund returns untaxed. Because the two models both confer a post-tax rate of return to savings equal to pre-tax rate of return, they are seen to be neutral between current and future consumption and thus to encourage saving for retirement. However, they raise revenues at different times. The EET model also called "cash-flow" tax or benefit tax, taxes pensions but exempts investment income (in fact, investment returns are taxed when pensions are paid to pensioners) and contributions. This treatment implies that taxes are deferred until retirement. The TEE model sometimes called "prepayment" tax or contribution tax, taxes contributions but exempts pensions and investment income. In this case, pension premiums are taxed before they are contributed to a pension scheme, so that the tax deferral benefit does not exist.

Chapter 5 calculates the *Degree of Fiscal Privileges* (DFiP) of five financial assets, i.e. bank deposits, government bonds, shares, private pensions and houses, using the tax treatments in five OECD countries, i.e. France, Germany, Sweden, New Zealand and the United Kingdom. The choice of these five OECD countries was made because their tax treatments on private pensions are different. France has the EET model, Germany (for provident funds) has the TEE model, Sweden has the ETT model, New Zealand has the TTE model, and finally, the United Kingdom has the EEt model. The DFiP for standard-rate taxpayers, who face the 20 percent rate of marginal income taxation, is extremely high under the UK tax system (24.5%) and, substantially high under the French and German tax systems (20%). On the other hand, it is relatively moderate under the Swedish tax system (15.3%) although the tax rates applied to investment returns on pension funds (10%) are lower than the tax rates on other capital income (30%). There are no fiscal privileges to private pensions under the tax system in New Zealand. If China keeps the current tax treatments on bank savings unchanged, (equivalent to the TTE model) the introduction of either of the three models, EEt, EET, and TEE, on private pensions would attract part of saving flows from bank accounts to private pension funds.

Chapter 6 has estimates tax revenues under the five tax models for the period of 2010 to 2067, and also calculates the revenue losses with respect to a benchmark model of TtE, i.e. the tax treatment on bank savings in China. If individuals' marginal rates of income tax do not change between working years and retirement years, the total revenue in present value terms under the five tax models EET, TEE, ETT, TTE and EEt are respectively 4,170bn, 8,209bn, 20,466bn, 22,995bn and 3,216bn Yuan. Consequently, the revenue losses are respectively 5,839bn, 1,799bn, -10,457bn, -12,985bn and 6,793.29bn Yuan, in comparison to the benchmark of tax treatment on bank savings. The amount of revenue losses for each of the models shows that in present value terms the TTE and ETT models do not result in any cost to the government (in fact the cost is negative), while EET has higher cost than TEE but lower than EEt. However, the distribution of the cost is different under the five models, which is shown by their annual costs during the period for estimation. The TEE model has cost throughout 58 years from 2010 to 2067, while the TTE model brings more revenues to the government every year. The TTE model has cost for the first 6 years but has negative cost thereafter.

The EET model results in cost for the first 28 years but brings more revenues thereafter. The EEt model has a similar pattern to the EET model, however, the value of the cost is higher.

The value of GDP in 1988 was 7,939.57bn Yuan in China. Suppose that it grows at 8 percent[58] between 2010 and 2067 then the annual average cost as a share of GDP[59] under the four models ETT, EET, TEE and EEt is 0.06%, 0.38%, 0.15% and 0.42% respectively. Even in a year with the highest cost, this ratio is only a little higher than 1 percent. Noting that the tax expenditures on private pensions as a percentage of GDP for 1995 were 0.1% in Germany, 0.9% in the United State, 1.7% in Australia, 1.9% in Ireland and the Netherlands and 2.4% in the United Kingdom, the costs estimated in China are not high in terms of international comparisons.

7.2 Future Policies on the Promotion of Private Pensions

For the purpose of encouraging Chinese people to save for their retirement, this thesis suggests the following three points as future policies:

- The application of the EET tax model to private pensions in order to alter individuals' choice about in which assets to invest. More specifically, higher return from pension saving can be expected to shift part of saving flows from bank accounts, which mainly of the short-term, to pension funds where the saving flows and accumulations are locked until retirement;

- The mandation of membership of private pension schemes in order to correct market failure in providing retirement income to those who have low income and short periods of employment but still have the capacity to save for their retirement, those who are short-sighted and do not care about their future needs, and those who are free riders and rely on society instead of saving during their productive years;

[58] Assuming that the average rate of population growth is stationary, then GDP will have an annual growth rate of 8 percent, which is the rate of wage growth used in the estimation in Chapter 6.

[59] See Appendix 7-1 and 7-2.

- The reduction of the benefit level of the current earnings-related public pension in order to leave a larger room for the development of private pensions. A reduction in pension benefits would tend to boost retirement saving by those who are currently covered by the public programme.

(a) Why EET model?

The choice of EET model is based on its three advantages in comparison to its alternatives. First, as discussed in chapter 4, the ETT and TTE models tax future consumption more heavily than current consumption by applying a tax on investment income; they can be seen as discouraging retirement saving behaviour. The EET model, however, does not favour current consumption over future. The nature of equal rate of return on saving before and after tax provides individuals higher incentive to save. Consequently, under the EET model, individuals facing the same tax rate have lower tax liability and thus expect more pension benefits in retirement.

Second, the EET model is more attractive to individuals than the TEE model because of the tenancy towards income smoothing under progressive income taxation in which marginal income tax rates increase as income increases. The EET model allows individuals to arrange the timing of saving and consumption according to their different earnings and tax liabilities between working and retirement years. Individuals who earn the bulk of their income during their working lives can avoid paying high marginal income tax rates on pension contributions whilst working and instead can pay considerably lower marginal income tax rates when they receive their pension benefits during retirement. They can do this by postponing their consumption until retirement through pension saving. The ability to defer taxation on pension savings until retirement confers sizeable tax benefits on individuals because marginal tax rates during the working life often exceed marginal tax rates during retirement. Therefore, tax incentives enhance the incentive for individuals to set up private pensions.

Third, the EET model is a better choice than the EEt model in taxing private pension saving. In comparison to the EEt model, which gives exemptions to lump-sum payments, the EET model guarantees individual savers adequate retirement incomes and also costs less in tax expenditure. The EEt model is shown to be an inappropriate tax

policy for supporting retirement saving and a waste of resources in terms of the loss of government revenues which would be raised otherwise. Although it provides higher return on saving, this tax treatment reduces the expected value of adequate retirement incomes for retirees and their dependants.

(b) Why cut public pensions?

As mentioned in Chapter 1 and fully explained in Chapter 2, the replacement rate of public old-age pension in China is high enough (could be as high as 90 percent) to maintain the living standard of covered workers in retirement life. Under this circumstance, the scope and role of private pensions are limited. The high level of benefits can reduce the incentive for people to save as they would neither need nor be able to have a private pension, as has been stated in Chapter 5. As already noted, this group of people would not need extra help from the government at retirement, having not saved, because the public programme guarantees them with adequate retirement income. Nevertheless, international experience proves that people do save in private funded retirement saving vehicles in the face of prospective cutbacks in public pension benefits, especially if provided with tax incentives at the same time. This means that a reduction in pension benefits would tend to boost retirement saving by those currently covered by the public programme. The role of tax incentives can be seen as compensation for the reduced pension benefits that they expect to receive.

(c) Why compulsion?

As mentioned in Chapter 1 and fully explained in Chapter 5, in about 30 countries either employers are mandated to set up a pension scheme for employees or individuals are mandated to contract with a personal pension scheme or life insurance company. Mandating savings for retirement can help to correct market failure in providing retirement income. It can mitigate the discriminative nature of private provision schemes in which the coverage is focused on large employers and high-income earners. It can also diminish the problem of myopia and moral hazard. If left to behave in accordance with their own preferences during their working life, some people may not save or not save adequately for their retirement because either they do not predict accurately how much they will need in retirement or they choose to rely on the

government. A policy of compulsion is important for those people as an inadequate saving during their working years will result in either poverty in old age or increases in future public spending. Although compulsion is an effective way of ensuring adequate saving, tax incentives will play a role of making the compulsion easier for people to accept because "tax privilege mitigates the associated element of coercion" (Davis, 1995: 105).

7.3 Problems with the EET Model and Appropriate Solutions

Promoting private pension schemes by using preferential tax arrangements, the application of the EET model in particular, has also raised three economic problems.

The *first problem* is a distortion of choice between saving through private pensions and saving via other financial instruments, especially interest-bearing bank accounts, because bank savings are currently taxed under the TTE tax model. The distortionary effect on resources allocation is hard to estimate because of two reasons pointed out by Heady: first, "it involves people making savings decisions that will have effects for a long time into the future"; second, "the financial markets are so complex that it is often difficult to trace through the effects of all these different tax treatments and demonstrate the way in which resources are being misallocated" (Heady, 1993: 39). From the viewpoint of individuals, private pension saving is not as flexible (low liquidity) as other forms of saving because the cash flows are tied up and can not be withdrawn before retirement. However, it is this nature that makes the private pension scheme more valuable than other saving instruments in terms of providing guaranteed benefits to individual savers on retirement until their death.

The *second problem* is inequality. The inequality results from the natures of private pension plans and progressive income taxation systems - private pension provisions do not tend to redistribute income towards lower income workers preferential tax treatments on private pension funds do not tend to treat different income groups fairly in terms of vertical equity. As shown in Chapter 3, private pension plans are more likely to cover workers of large organisations, the high-paid and the fully and steadily employed. Those who are unemployed, part-time or temporarily employed are less likely to have a

private pension. Moreover, tax privilege to private pension funds has adverse benefits distribution as the value of tax incentives to private pensions usually increases with taxpayers' marginal rates. The calculations in Chapter 5 show that the *Degree of Fiscal Privilege* for taxpayers facing a marginal rate of 45 percent on income tax is higher than that for taxpayers facing a rate of 20 percent. This implies that the generous tax treatment would apply to only a small segment of private pension scheme members, especially those high-income workers who are in a higher marginal income tax bracket and would be able to use retirement saving plans to a greater extent than low-income workers. The estimations of tax costs in Chapter 6 also show that the EET tax treatment on private pension funds has a regressive impact on equity. The tax deferral benefit under the EET tax model has greater value for high-income workers the more progressive the scale of income taxation and the greater the income disparity between active working and passive retirement life. To sum up, the change in the pension mix would make low-income workers worse off as they would receive reduced public pension benefits and would be unlikely to receive benefits from private pension schemes. Conversely, it would benefit high-income earners who would enjoy relatively higher fiscal welfare from tax afforded private pension schemes.

The distribution of income through what Titmuss called fiscal welfare must be taken into account in analysing and designing the overall welfare system. This is because fiscal welfare provides the government with less financial resources to allocate through public social policy programmes. To narrow the gap between the rich and the poor resulting from the partial privatisation of pension provision through tax incentives, the government must provide a form of social assistance for those who are currently not covered by the earnings-related public pension nor capable of saving for their retirement. Suggestions to this point include either or both of the following two alternatives.

- The first alternative is the provision of a 'first tier' pension with either means-tested benefits or universal benefits. Compared to the universal approach, means testing has two main advantages. The first advantage is high redistribution. The benefit is based not on previous income from work measured by the number of years of employment but on individuals' present income. More specifically, the benefit is

provided to low-income groups who require redistribution of resources across individuals and generations. The second advantage is low cost: means-testing is tailored to the conditions of individuals - benefits are targeted only at those who are in absolute need, having no or very low income resources. However, the means-testing approach has two disadvantages. The first disadvantage is administrative complexity: it requires investigations of personal circumstances such as need and income. It would be extremely difficult to conduct such investigations in China where the share of the population in poverty is large, as it is of those just above the poverty line and vulnerable to poverty. The second disadvantage is that it acts as a saving disincentive for those in the eligible income range.

Contrasting to its counterpart, the universal approach seems to be more practical. Gough argues that a universal approach has the advantage of administrative simplicity over means testing. "The benefit does not relate to previous earnings or present income but to all people who are retired (or who reach a certain age, say, 65). As it is paid to all people who have satisfied their eligibility through their ID card, the problem encountered in targeting poor people does not exist" (Gough, 2002). However, this approach has two distinctive disadvantages. First, it has higher costs so may encounter political and financial difficulties in its operation. Second, it is less redistributive due to its inclusiveness. This is because the benefit is paid to everyone including those who have already had a public pension and those with high-incomes though the benefit can be fixed instead of being linked to former income or contributions paid.

- The second alternative requires an extension of the current insurance-based public pension programme. The coverage must be extended further to the three groups including those urban citizens who are not covered by the system, those workers employed in Individual and Private Enterprises (IEs and PEs), Township and Village enterprises and peasants who constitute 80 percent of the national population but have limited income resources in their old age in comparison to urban citizens.

The *third problem* of the EET model is the cost to the government in terms of foregone revenues. The estimations under the assumptions set up in Chapter 6 show that EET results in much higher cost compared to the ETT model, with an annual average cost of

0.38 percent and 0.06 percent of GDP respectively during the period of 2010-2067 for the estimation. The ratio of cost to GDP is still higher in comparison to that under the TEE model, 0.38 percent versus 0.15 percent on average during the same period. Moreover, as tax payments defer from a period when taxpayers are subject to a higher marginal tax rate of 25 percent to a period when they are subject to a lower marginal rate of 5 percent, the annual average cost as a percentage of GDP under the EET model increases from 0.38 to 0.52. However, the distribution of the cost under the two models is different. Unlike the TEE model that systematically has positive cost during the 58 years, the EET model results in higher cost in the first 28 years following the creation of the private pension scheme, however but generates negative cost thereafter. This is an important feature for fiscal consideration.

The government could have the following five approaches to keeping the cost of tax privileges on private pensions manageable. However, a combination of the last three approaches can be regarded as optimal.

- The first approach is to apply the ETT model at the start of the pension scheme and later move on to the EET model. As the investment incomes of pension funds are not tax exempt, the cost resulting from revenue losses will be lower. The disadvantage is that private pensions are not tax privileged under this tax treatment. Under this circumstance, enterprises or employers may not have incentives to provide retirement pensions for their employees. Similarly, individuals may not save in private pension schemes in which their money is tied up for up to 30 or 40 years.

- The second approach is to apply the TEE model at the start of the pension plan and later move to the EET model. This approach has two main advantages. First, both employers and individuals are given tax incentives to participate in private pension schemes. Second, the cost is lower and thus manageable in the early years of the creation of the pension scheme because the TEE model leads to reduced annual government deficits in the near term. The disadvantage is that once government revenue has been placed in earlier years, it is difficult to rearrange it in later years as the tax treatment moves to the EET model because of the relative importance of this income item in the budget.

- The third approach is to apply the EET tax treatmentt directly from the creation of the pension scheme. However, the pension scheme covers only part of the urban working population such as government employees and workers in large enterprises during the early years and expands to other employees gradually. The first advantage of this approach is policy consistency. Experience tells us that changes in tax policy are often associated with administrative complexity or difficulties. Also, a stable tax policy will help to build up individuals' confidence on private pension schemes. The second advantage is budget sustainability. As mentioned earlier, tax revenues come in later years under the EET model. This is an important practical issue because the society expects more aged people especially from the second half of the twenty-first Century when more revenues are required to support the aged population in their retirement. In this sense, the EET model is seen as desirable to bring the government fiscal arrangement into balance.

- The fourth approach is to increase tax revenues by improving tax administration on personal income in particular. Although in the past two decades, revenue from personal income taxation grew from 7.2bn in 1994 to 66bn Yuan in 1998, it remains very low with respect to total government revenues. The ratio of personal income tax to total tax revenues in China stood at only 5.21 percent in 2000. This low ratio is partly due to tax evasions by high-income earners such as actors, athletes, lawyers, employees in financial sectors and some self-employed. Statistics (*China Daily*, 22 August 2001) for 2000 from the State Administration of Taxation reported that high-income earners, who made up 8.7 percent of the total population and owned more than 60 percent of the funds in bank accounts, contributed less than 20 percent to total income tax revenues. Becke (1968) and Allingham and Sandmo (1972) suggest that tax evaders are willing to take the risk of not complying with tax laws if the benefit for doing so outweighs the expected cost. Therefore, the tax authorities can enhance tax administration by keeping track of sources of personal income, setting up special files for especially high-income earners and strengthening the inspection of these taxpayers' income tax. It is also necessary that tax law breakers be punished with proportionate fines or, for severe cases, imprisonment. One can expect that the ratio of personal income taxation to total revenues will grow further as a result of a more efficient administration on income taxation in China.

It must be pointed out that enhancing personal income tax administration also has positive effect on private pensions. Supposing that an individual who has income *Y* has a choice between either investing in a tax advantages afforded private pension plans with tax exemption on returns (*r*) to saving, or alternatively, investing in other forms of saving without tax advantages. He would gain a benefit that equals *r* from the former as returns are not taxed, whilst he would finish up with an income of *(1-t)*r* from the latter (*t* is the rate of tax on return to saving). Obviously, the individual would choose saving through private pensions rather than other forms of saving. However, suppose that the individual succeeded in evading taxes by, for example, concealing all of his investment income, he would gain exactly the same amount of income *r* as he saved in a private pension scheme. Were this the case, the individual would have no incentive to save through private pensions under preferential tax treatments. In this sense, an improved tax administration would prevent individuals from evading tax liabilities, whilst encouraging them to invest in tax advantaged private pensions, designed with a view to minimising the size of tax liability.

- The fifth approach to dealing with the cost is that of government borrowing. However, it must be noted that the current debt has to be paid in future years and is shown as an increase in income taxes paid by future generations. This relates to the issue of intertemporal budget balance that requires that future generations are not made worse off compared to current generations.

7.4 Future Works

Possible future work on this subject could include:

- first, an analysis of the extent to which the current pay-as-you-go public pension should be replaced by funded privately administrated pensions in China. Certainly, the analysis must be conducted from social, economic as well as political perspectives. In the Chinese context, the answer to this has to reflect the Chinese social and economic objectives that intertwine with the Chinese culture.

- second, an examination of the distortionary effect on resources allocations resulting from the preferential tax treatments on private pensions and the impact of pension funds on capital markets in China as more saving flows shift from bank accounts to pension funds.

- third, a study on how to make means-tested benefits or universal benefits available in China, what the level of the benefits should be and to whom these benefits should be provided. This is an important issue because, on one hand, it affects the welfare status of low-income people in comparison to that of the rich, on the other, it increases government expenditures on public social policy programmes.

- last but not least, a research on the impact of a pay-as-you-go based pension, a move towards a funded pension and debt finance for making up government deficits on intra-generational redistribution. The question of whether these policies place a burden on future generations can be assessed by the method of generational accounting (Auerbach, Kotlikoff and Leibfritz, 1999).

Appendices

1-1: The Rate of Coverage of Private Pension Schemes in China

Part 1: Number of employees

Year	Enterprises pension schemes			Personal pension schemes			**Total**
	SOEs	*COEs*	*Others*	*SOEs*	*COEs*	*Others*	
1993	453,949	18,867	31,828	615,414	91,427	21,337	**1,232,822**
1994	1,006,191	36,181	36,720	707,148	99,785	23,615	**1,909,640**
1995	933,866	44,240	84,597	954,861	161,998	78,755	**2,258,317**
1996	946,369	35,017	6,281	1,082,981	156,218	1,927	**2,228,793**

Part 2: The rate of coverage (%)

Year	Enterprises pension schemes			Personal pension schemes			**Total**
	SOEs	*COEs*	*Others*	*SOEs*	*COEs*	*Others*	
1993	0.59	0.06	0.60	0.81	0.28	0.40	**1.07**
1994	1.33	0.12	0.49	0.94	0.32	0.32	**1.67**
1995	1.25	1.25	0.97	1.28	0.55	0.90	**2.00**
1996	1.28	0.12	0.07	1.46	0.55	0.02	**1.99**

Source: Numbers in Part 1 are from Tables 2-71, 2-72, 2-75, 2-76 in the 1997 *China Social Insurance Statistics Yearbook*. Numbers in Part 2 are calculated by the author based on part 1 and Tables 2-6, 2-7 in the same reference.

5-1: The Features of Private Pensions in Some OECD Countries

Country	Establishment	Coverage	Type of scheme	Financing	Fund assets as % GDP(1996)
Australia	Voluntary/ Compulsory	91.5%	DB or DC	Mainly Funded	31.6
Austria	n.a.	n.a.	n.a.	Funded	1.2
Belgium	Voluntary	31%	DB mainly	Funded	4.1
Canada	Voluntary	45%	DB or DC	Funded	43.0
Denmark	Compulsory	80%	DC	Funded	23.9
Finland	Compulsory	100%	DB	Mainly Funded	40.8
France	Compulsory	100%	DB	PAYG	5.6
Germany	Voluntary	50%	DB or DC	Funded (mainly book reserves)	5.8
Greece	Voluntary	5%	n.a.	PAYG	12.7
Ireland	Voluntary	46%	DB or DC	Mainly funded	45.0
Italy	Voluntary	5%	DB or DC	Funded	3.0
Japan	Voluntary/ Opting out	37%	DB	Funded	41.8
Luxembourg	Voluntary	30%	DB	Funded (mainly book reserves)	19.7
Netherlands	Voluntary	50%	DB	Funded	87.3
N Zealand	Voluntary	23%	DB or DC	Funded	n.a.
Norway	Voluntary	25%	DB	Funded	7.3
Portugal	Voluntary	15%	DB mainly	Funded	9.9
Spain	Voluntary	3%	DC mainly	Funded	3.8
Sweden	Compulsory	100%	DB	PAYG/Funded	32.6
Switzerland	Compulsory	100%	DB or DC	Funded	117.1
Turkey	n.a.	n.a.	n.a.	n.a.	n.a.
UK	Voluntary/ Opting out	48%	DB or DC	Funded	74.7
USA	Voluntary	58.8%	DB or DC	Funded	58.2

Source: (1) Pestieau, P. "The Distribution of Private Pensions: How Fair Is It?", Table 3.1. **in** OECD (1992) *Private Pensions And Public Policy.*

(2) Kalisch, d. w. and Tetsuya Aman (1998). "Retirement Income Systems: The Reform Process Across OECD Countries", Table 5. Paris: OECD.

(3) Laboul, A. (1998). "Private Pension Systems: Regulatory Policies", pp. 21; 26. Paris: OECD.

(4) OECD (1998: p. 65). *Maintaining prosperity in an Ageing Society,* Table V.1. Paris, OECD.

6-1 Annuities at Retirement under Alternative Tax Treatments

(Men, 20% tax rate during working, 20% tax rate during retirement, Yuan)

Age	EET	ETT	EEt	TEE	TTE	Bank D
21	193581.35	70523.37	145186.01	193581.35	70523.37	20061.68
22	175983.05	66095.00	131987.28	175983.05	66095.00	18905.76
23	159984.59	61944.71	119988.44	159984.59	61944.71	18462.65
24	145440.53	58055.02	109080.40	145440.53	58055.02	18029.93
25	132218.67	54409.58	99164.00	132218.67	54409.58	17607.36
26	120198.79	50993.05	90149.09	120198.79	50993.05	17194.68
27	109271.62	47791.04	81953.72	109271.62	47791.04	16791.68
28	99337.84	44790.11	74503.38	99337.84	44790.11	16398.13
29	90307.13	41977.61	67730.34	90307.13	41977.61	16013.80
30	82097.39	39341.71	61573.04	82097.39	39341.71	15638.47
31	74633.99	36871.33	55975.49	74633.99	36871.33	15271.95
32	66137.45	33190.61	49603.09	66137.45	33190.61	13944.41
33	58540.11	29842.16	43905.08	58540.11	29842.16	12719.81
34	51750.84	26797.62	38813.13	51750.84	26797.62	11590.41
35	45687.47	24030.97	34265.60	45687.47	24030.97	10549.06
36	40275.96	21518.34	30206.97	40275.96	21518.34	9589.13
37	35449.60	19237.82	26587.20	35449.60	19237.82	8704.49
38	31148.30	17169.35	23361.22	31148.30	17169.35	7889.47
39	27317.91	15294.50	20488.43	27317.91	15294.50	7138.81
40	23909.73	13596.40	17932.29	23909.73	13596.40	6447.65
41	20879.87	12059.57	15659.90	20879.87	12059.57	5811.49
42	18188.89	10669.84	13641.66	18188.89	10669.84	5226.17
43	15801.26	9414.229	11850.95	15801.26	9414.22	4687.83
44	13685.07	8280.83	10263.80	13685.07	8280.83	4192.92
45	11811.61	7258.78	8858.71	11811.61	7258.78	3738.13
46	10155.08	6338.09	7616.31	10155.08	6338.09	3320.41
47	8692.32	5509.65	6519.24	8692.32	5509.65	2936.92
48	7402.50	4765.12	5551.87	7402.50	4765.12	2585.07
49	6266.94	4096.86	4700.21	6266.94	4096.86	2262.43
50	5268.89	3497.90	3951.66	5268.89	3497.90	1966.77
51	4393.29	2961.86	3294.97	4393.29	2961.86	1696.00
52	3626.67	2482.92	2720.00	3626.67	2482.92	1448.22
53	2956.95	2055.75	2217.71	2956.95	2055.75	1221.66
54	2373.30	1675.50	1779.97	2373.30	1675.50	1014.68
55	1866.03	1337.73	1399.52	1866.03	1337.73	825.76
56	1426.46	1038.40	1069.85	1426.46	1038.40	653.50

6-2 Annuities at Retirement under Alternative Tax Treatments

(Men, 20% tax rate during working, 5% tax rate during retirement, Yuan)

Age	EET	ETT	EEt	TEE	TTE	Bank D
21	229877.86	83746.50	172408.39	193581.35	70523.37	20061.68
22	208979.87	78487.82	156734.91	175983.05	66095.00	18905.76
23	189981.70	73559.34	142486.27	159984.59	61944.71	18462.65
24	172710.64	68940.34	129532.98	145440.54	58055.02	18029.93
25	157009.67	64611.38	117757.25	132218.67	54409.58	17607.36
26	142736.06	60554.24	107052.04	120198.79	50993.05	17194.68
27	129760.05	56751.87	97320.04	109271.62	47791.04	16791.68
28	117963.69	53188.25	88472.76	99337.84	44790.11	16398.13
29	107239.71	49848.41	80429.78	90307.13	41977.61	16013.80
30	97490.65	46718.28	73117.99	82097.39	39341.71	15638.47
31	88627.86	43784.71	66470.90	74633.99	36871.33	15271.95
32	78538.22	39413.85	58903.67	66137.45	33190.61	13944.41
33	69516.38	35437.56	52137.29	58540.11	29842.16	12719.81
34	61454.12	31822.17	46090.59	51750.84	26797.62	11590.41
35	54253.87	28536.77	40690.40	45687.47	24030.97	10549.06
36	47827.71	25553.02	35870.78	40275.96	21518.34	9589.13
37	42096.41	22844.92	31572.30	35449.60	19237.82	8704.49
38	36988.60	20388.61	27741.45	31148.30	17169.35	7889.47
39	32440.02	18162.22	24330.02	27317.91	15294.50	7138.81
40	28392.80	16145.72	21294.60	23909.73	13596.40	6447.65
41	24794.85	14320.74	18596.14	20879.87	12059.57	5811.49
42	21599.30	12670.44	16199.48	18188.89	10669.84	5226.17
43	18764.00	11179.39	14073.00	15801.26	9414.22	4687.83
44	16251.02	9833.49	12188.27	13685.07	8280.83	4192.92
45	14026.29	8619.80	10519.72	11811.61	7258.78	3738.13
46	12059.16	7526.48	9044.37	10155.08	6338.09	3320.41
47	10322.13	6542.71	7741.60	8692.32	5509.65	2936.92
48	8790.47	5658.58	6592.85	7402.50	4765.12	2585.07
49	7442.00	4865.02	5581.50	6266.94	4096.86	2262.43
50	6256.80	4153.76	4692.60	5268.89	3497.90	1966.77
51	5217.03	3517.21	3912.77	4393.29	2961.86	1696.00
52	4306.68	2948.47	3230.01	3626.67	2482.92	1448.22
53	3511.38	2441.21	2633.53	2956.95	2055.75	1221.66
54	2818.29	1989.66	2113.72	2373.30	1675.50	1014.68
55	2215.91	1588.56	1661.93	1866.03	1337.73	825.76
56	1693.93	1233.10	1270.44	1426.46	1038.40	653.50

6-3 Annuities at Retirement under Alternative Tax Treatments

(Women, 20% tax rate during working, 20% tax rate during retirement, Yuan)

Age	EET	ETT	EEt	TEE	TTE	Bank D
21	110973.27	45322.35	83229.95	110973.27	45512.33	14240.27
22	100884.79	42476.43	75663.59	100884.79	42476.43	13877.48
23	91713.44	39809.21	68785.08	91713.44	39809.21	13552.22
24	83375.86	37309.47	62531.89	83375.86	37309.47	13234.59
25	75796.23	34966.70	56847.17	75796.23	34966.70	12924.41
26	68905.67	32771.04	51679.25	68905.67	32771.04	12621.49
27	61061.26	29499.64	45795.94	61061.26	29499.64	11524.35
28	54047.03	26523.55	40535.27	54047.03	26523.55	10512.28
29	47778.85	23817.58	35834.13	47778.85	23817.58	9578.89
30	42180.86	21358.59	31635.64	42180.86	21358.59	8718.27
31	37184.69	19125.38	27888.52	37184.69	19125.38	7924.93
32	32728.77	17098.48	24546.58	32728.77	17098.48	7193.82
33	28757.60	15260.03	21568.20	28757.60	15260.03	6520.25
34	25221.20	13593.67	18915.90	25221.20	13593.67	5899.86
35	22074.60	12084.41	16555.95	22074.60	12084.41	5328.65
36	19277.30	10718.48	14457.97	19277.30	10718.48	4802.90
37	16792.85	9483.30	12594.64	16792.85	9483.30	4319.16
38	14588.48	8367.31	10941.36	14588.48	8367.31	3874.26
39	12634.71	7359.96	9476.03	12634.71	7359.96	3465.24
40	10905.04	6451.56	8178.78	10905.04	6451.56	3089.37
41	9375.66	5633.26	7031.74	9375.66	5633.26	2744.15
42	8025.16	4896.95	6018.87	8025.16	4896.95	2427.22
43	6834.34	4235.21	5125.75	6834.34	4235.21	2136.43
44	5785.94	3641.27	4339.45	5785.94	3641.27	1869.79
45	4864.49	3108.91	3648.36	4864.49	3108.91	1625.43
46	4056.10	2632.49	3042.07	4056.10	2632.49	1401.66
47	3348.32	2206.80	2511.24	3348.32	2206.80	1196.88
48	2730.00	1827.14	2047.50	2730.00	1827.14	1009.64
49	2191.14	1489.18	1643.36	2191.14	1489.18	838.58
50	1722.81	1188.97	1292.10	1722.81	1188.97	682.45
51	1316.98	922.92	987.738	1316.98	922.92	540.09

6-4 Annuities at Retirement under Alternative Tax Treatments

(Women, 20% tax rate during working, 5% tax rate during retirement, Yuan)

Age	EET	ETT	EEt	TEE	TTE	Bank D
21	131780.76	53820.29	98835.57	110973.27	45322.35	14210.54
22	119800.69	50440.76	89850.52	100884.79	42476.43	13877.48
23	108909.72	47273.44	81682.29	91713.44	39809.21	13552.22
24	99008.83	44305.00	74256.62	83375.86	37309.47	13234.59
25	90008.03	41522.96	67506.02	75796.23	34966.70	12924.41
26	81825.48	38915.62	61369.11	68905.67	32771.04	12621.49
27	72510.24	35030.82	54382.68	61061.26	29499.64	11524.35
28	64180.85	31496.72	48135.64	54047.03	26523.55	10512.28
29	56737.38	28283.38	42553.04	47778.85	23817.58	9578.89
30	50089.77	25363.33	37567.32	42180.86	21358.59	8718.27
31	44156.83	22711.39	33117.62	37184.69	19125.38	7924.93
32	38865.42	20304.44	29149.06	32728.77	17098.48	7193.82
33	34149.65	18121.28	25612.23	28757.60	15260.03	6520.25
34	29950.18	16142.49	22462.63	25221.20	13593.67	5899.86
35	26213.59	14350.23	19660.19	22074.60	12084.41	5328.65
36	22891.79	12728.20	17168.84	19277.30	10718.48	4802.90
37	19941.51	11261.41	14956.13	16792.85	9483.30	4319.16
38	17323.82	9936.18	12992.87	14588.48	8367.31	3874.26
39	15003.72	8739.95	11252.79	12634.71	7359.96	3465.24
40	12949.74	7661.23	9712.30	10905.04	6451.56	3089.37
41	11133.60	6689.50	8350.20	9375.66	5633.26	2744.15
42	9529.88	5815.13	7147.41	8025.16	4896.95	2427.22
43	8115.78	5029.31	6086.83	6834.34	4235.21	2136.43
44	6870.81	4324.00	5153.10	5785.94	3641.27	1869.79
45	5776.58	3691.84	4332.43	4864.49	3108.91	1625.43
46	4816.62	3126.08	3612.46	4056.10	2632.49	1401.66
47	3976.13	2620.58	2982.10	3348.32	2206.80	1196.88
48	3241.87	2169.73	2431.40	2730.00	1827.14	1009.64
49	2601.98	1768.40	1951.49	2191.14	1489.18	838.58
50	2045.83	1411.90	1534.37	1722.81	1188.97	682.45
51	1563.92	1095.97	1172.94	1316.98	922.92	540.09

6-5 Annual Tax Revenues under Alternative Tax Treatments

(20% tax rate during working, 20% tax rate during retirement, billion Yuan)

Year	EET	TEE	EEt	ETT	TTE	Bank D
2010	-	193,12	-	31,87	218,62	197,76
2011	-	213,56	-	69,04	268,79	223,40
2012	-	235,81	-	112,33	325,67	251,51
2013	-	260,10	-	162,66	390,22	282,41
2014	-	285,73	-	220,33	462,00	315,39
2015	3,78	307,55	2,84	288,32	536,05	345,27
2016	8,94	329,05	6,70	363,26	614,59	375,32
2017	15,74	351,65	11,80	447,28	700,64	407,18
2018	24,49	375,46	18,37	541,42	794,99	441,03
2019	34,84	400,59	26,13	645,48	897,82	476,95
2020	47,67	427,04	35,76	761,16	1.010,06	515,04
2021	64,58	451,69	48,44	885,23	1.125,17	551,63
2022	85,39	477,26	64,04	1.022,02	1.249,52	589,97
2023	110,78	503,85	83,09	1.172,89	1.384,01	630,20
2024	140,71	531,54	105,53	1.338,00	1.528,99	672,40
2025	176,57	560,24	132,42	1.519,15	1.685,18	716,57
2026	217,70	587,17	163,27	1.706,18	1.841,99	758,84
2027	266,41	614,61	199,81	1.909,11	2.008,73	802,41
2028	323,90	642,58	242,92	2.129,47	2.186,21	847,38
2029	390,58	671,14	292,93	2.367,80	2.374,93	893,80
2030	468,52	700,07	351,39	2.625,53	2.574,94	941,47
2031	545,94	730,47	409,46	2.884,07	2.778,02	990,35
2032	634,33	761,09	475,75	3.159,56	2.990,56	1.040,11
2033	733,99	791,96	550,49	3.452,58	3.213,23	1.090,81
2034	846,74	823,21	635,06	3.764,94	3.446,89	1.142,63
2035	974,51	854,42	730,88	4.096,56	3.690,40	1.195,07
2036	1.106,24	887,08	829,68	4.434,34	3.940,26	1.249,11
2037	1.253,27	919,49	939,95	4.788,72	4.197,86	1.303,32
2038	1.415,75	951,66	1.061,81	5.159,79	4.463,64	1.357,74
2039	1.596,36	983,63	1.197,27	5.549,68	4.738,30	1.412,48
2040	1.796,98	589,42	1.623,92	5.886,66	4.537,96	971,47
2041	2.037,39	584,13	1.798,17	6.230,42	4.720,48	976,32
2042	2.299,68	578,83	1.987,89	6.576,09	4.900,05	980,49
2043	2.585,42	573,54	2.194,18	6.923,02	5.076,22	983,90
2044	2.896,27	568,24	2.401,40	7.270,49	5.248,51	986,49
2045	3.234,96	562,95	2.635,16	7.617,27	5.415,52	988,28
2046	3.598,84	560,11	2.897,80	7.949,76	5.566,62	992,93
2047	3.978,49	557,28	3.170,87	8.274,22	5.709,48	996,97
2048	4.376,72	554,45	3.456,33	8.590,96	5.844,21	1.000,36
2049	4.796,66	551,61	3.737,16	8.900,33	5.971,00	1.003,07
2050	5.240,58	548,78	4.049,39	9.201,74	6.089,13	1.005,67
2051	5.623,77	548,00	4.321,11	9.450,57	6.183,39	1.009,00
2052	5.990,10	547,22	4.578,17	9.677,93	6.265,91	1.011,61
2053	6.341,83	546,45	4.822,06	9.885,59	6.337,92	1.013,54
2054	6.681,55	545,67	5.045,97	10.075,42	6.400,75	1.014,83
2055	7.009,89	544,89	5.271,36	10.248,95	6.455,40	1.015,63
2056	7.283,73	543,89	5.455,14	10.382,04	6.491,42	1.015,06
2057	7.537,31	542,89	5.621,04	10.494,63	6.517,13	1.014,02
2058	7.772,38	541,89	5.829,29	10.588,57	6.533,87	1.012,56
2059	7.993,17	540,88	5.994,88	10.667,57	6.543,15	1.010,74
2060	8.202,08	539,88	6.151,56	10.734,12	6.546,37	1.008,68
2061	8.345,12	536,87	6.258,84	10.765,15	6.538,29	1.003,87
2062	8.460,89	533,86	6.345,66	10.777,91	6.522,72	998,81
2063	8.549,93	530,86	6.412,45	10.774,06	6.500,95	993,55
2064	8.615,61	527,85	6.461,71	10.757,36	6.474,37	988,13
2065	8.661,47	524,84	6.496,10	10.730,62	6.444,44	982,61
2066	8.663,06	521,36	6.497,30	10.698,04	6.420,96	977,19
2067	8.628,64	517,88	6.471,48	10.652,74	6.395,12	971,70

6-6 Annual Tax Revenues under Alternative Tax Treatments

(20% tax rate during working, 5% tax rate during retirement, billion Yuan)

Year	EET	TEE	EET(L)	ETT	TTE	Bank D
2010	-	193,12	-	31,87	218,62	197,76
2011	-	213,56	-	69,04	268,79	223,40
2012	-	235,81	-	112,33	325,67	251,51
2013	-	260,10	-	162,66	390,22	282,41
2014	-	285,73	-	220,33	462,00	315,39
2015	0,95	307,55	0,71	286,29	536,05	345,27
2016	2,23	329,05	1,68	358,51	614,59	375,32
2017	3,93	351,65	2,95	439,00	700,64	407,18
2018	6,12	375,46	4,59	528,67	794,99	441,03
2019	8,71	400,59	6,53	627,53	897,82	476,95
2020	11,92	427,04	8,94	736,87	1.010,06	515,04
2021	16,15	451,69	12,11	852,69	1.125,17	551,63
2022	21,35	477,26	16,01	979,50	1.249,52	589,97
2023	27,70	503,85	20,77	1.118,37	1.384,01	630,20
2024	35,18	531,54	26,38	1.269,61	1.528,99	672,40
2025	44,14	560,24	33,11	1.434,42	1.685,18	716,57
2026	51,46	587,17	40,82	1.602,93	1.841,99	758,84
2027	63,67	614,61	49,95	1.784,26	2.008,73	802,41
2028	78,07	642,58	60,73	1.979,52	2.186,21	847,38
2029	94,85	671,14	73,23	2.189,25	2.374,93	893,80
2030	114,23	700,07	87,85	2.414,08	2.574,94	941,47
2031	133,62	730,47	102,36	2.640,60	2.778,02	990,35
2032	155,74	761,09	118,94	2.880,03	2.990,56	1.040,11
2033	180,68	791,96	137,62	3.133,08	3.213,23	1.090,81
2034	209,04	823,21	158,76	3.400,94	3.446,89	1.142,63
2035	240,88	854,42	182,72	3.682,86	3.690,40	1.195,07
2036	273,84	887,08	207,42	3.970,93	3.940,26	1.249,11
2037	310,62	919,49	234,99	4.270,65	4.197,86	1.303,32
2038	351,26	951,66	265,45	4.582,43	4.463,64	1.357,74
2039	396,67	983,63	299,32	4.907,42	4.738,30	1.412,48
2040	446,73	589,42	336,93	5.173,42	4.537,96	971,47
2041	506,85	584,13	382,01	5.435,44	4.720,48	976,32
2042	572,44	578,83	431,19	5.695,17	4.900,05	980,49
2043	643,90	573,54	484,77	5.952,02	5.076,22	983,90
2044	721,97	568,24	543,05	6.205,37	5.248,51	986,49
2045	806,56	562,95	606,55	6.453,60	5.415,52	988,28
2046	897,55	560,11	674,78	6.681,04	5.566,62	992,93
2047	992,47	557,28	745,97	6.898,74	5.709,48	996,97
2048	1.094,18	554,45	820,64	7.106,90	5.844,21	1.000,36
2049	1.199,17	551,61	899,37	7.305,76	5.971,00	1.003,07
2050	1.310,14	548,78	982,61	7.494,52	6.089,13	1.005,67
2051	1.405,94	548,00	1.054,46	7.645,82	6.183,39	1.009,00
2052	1.497,53	547,22	1.123,14	7.780,75	6.265,91	1.011,61
2053	1.585,46	546,45	1.189,09	7.900,90	6.337,92	1.013,54
2054	1.670,39	545,67	1.252,79	8.007,99	6.400,75	1.014,83
2055	1.752,47	544,89	1.314,36	8.103,34	6.455,40	1.015,63
2056	1.820,93	543,89	1.365,70	8.171,32	6.491,42	1.015,06
2057	1.884,33	542,89	1.413,24	8.224,50	6.517,13	1.014,02
2058	1.943,10	541,89	1.457,32	8.264,63	6.533,87	1.012,56
2059	1.998,29	540,88	1.498,72	8.294,02	6.543,15	1.010,74
2060	2.050,52	539,88	1.537,89	8.314,62	6.546,37	1.008,68
2061	2.086,28	536,87	1.564,71	8.317,61	6.538,29	1.003,87
2062	2.115,22	533,86	1.586,42	8.309,03	6.522,72	998,81
2063	2.137,48	530,86	1.603,11	8.290,48	6.500,95	993,55
2064	2.153,90	527,85	1.615,43	8.264,21	6.474,37	988,13
2065	2.165,37	524,84	1.624,03	8.232,28	6.444,44	982,61
2066	2.165,77	521,36	1.624,32	8.205,39	6.420,96	977,19
2067	2.157,16	517,88	1.617,87	8.173,09	6.395,12	971,70

7-1 Annual Cost as a Share of GDP under Alternative Tax Treatments

(20% tax rate during working, 20% tax rate during retirement, billion Yuan)

Year	EET	TEE	EEt	ETT	TTE
2010	0,99	0,02	0,99	0,83	-0,10
2011	1,03	0,05	1,03	0,71	-0,21
2012	1,08	0,07	1,08	0,60	-0,32
2013	1,12	0,09	1,12	0,48	-0,43
2014	1,16	0,11	1,16	0,35	-0,54
2015	1,17	0,13	1,17	0,20	-0,65
2016	1,18	0,15	1,18	0,05	-0,75
2017	1,18	0,16	1,18	-0,09	-0,86
2018	1,18	0,18	1,18	-0,24	-0,96
2019	1,17	0,19	1,18	-0,38	-1,05
2020	1,17	0,20	1,17	-0,51	-1,15
2021	1,15	0,21	1,16	-0,65	-1,23
2022	1,13	0,22	1,14	-0,77	-1,31
2023	1,11	0,23	1,12	-0,90	-1,39
2024	1,09	0,24	1,10	-1,02	-1,46
2025	1,06	0,25	1,08	-1,13	-1,53
2026	1,03	0,25	1,05	-1,23	-1,58
2027	1,00	0,25	1,02	-1,33	-1,63
2028	0,96	0,26	0,98	-1,42	-1,68
2029	0,93	0,26	0,95	-1,50	-1,72
2030	0,89	0,26	0,92	-1,58	-1,75
2031	0,85	0,26	0,88	-1,64	-1,78
2032	0,81	0,26	0,85	-1,69	-1,79
2033	0,78	0,25	0,81	-1,74	-1,81
2034	0,74	0,25	0,78	-1,78	-1,82
2035	0,70	0,25	0,74	-1,82	-1,82
2036	0,66	0,24	0,70	-1,84	-1,82
2037	0,62	0,24	0,67	-1,86	-1,81
2038	0,58	0,24	0,63	-1,87	-1,80
2039	0,55	0,23	0,60	-1,88	-1,79
2040	0,26	0,19	0,32	-2,09	-1,77
2041	0,22	0,18	0,27	-2,05	-1,72
2042	0,17	0,17	0,23	-2,01	-1,67
2043	0,13	0,16	0,20	-1,96	-1,61
2044	0,10	0,15	0,16	-1,91	-1,56
2045	0,06	0,14	0,13	-1,85	-1,50
2046	0,03	0,14	0,10	-1,78	-1,43
2047	0,00	0,13	0,07	-1,71	-1,37
2048	-0,03	0,12	0,05	-1,64	-1,30
2049	-0,05	0,11	0,03	-1,57	-1,24
2050	-0,07	0,11	0,01	-1,49	-1,17
2051	-0,08	0,10	-0,01	-1,41	-1,10
2052	-0,10	0,09	-0,02	-1,34	-1,04
2053	-0,10	0,09	-0,03	-1,26	-0,97
2054	-0,11	0,08	-0,04	-1,18	-0,91
2055	-0,12	0,07	-0,05	-1,11	-0,85
2056	-0,12	0,07	-0,05	-1,04	-0,79
2057	-0,12	0,06	-0,05	-0,97	-0,74
2058	-0,12	0,06	-0,06	-0,90	-0,69
2059	-0,11	0,05	-0,06	-0,84	-0,64
2060	-0,11	0,05	-0,06	-0,78	-0,59
2061	-0,11	0,05	-0,06	-0,72	-0,55
2062	-0,10	0,04	-0,05	-0,67	-0,51
2063	-0,10	0,04	-0,05	-0,62	-0,47
2064	-0,09	0,04	-0,05	-0,57	-0,43
2065	-0,09	0,03	-0,05	-0,53	-0,40
2066	-0,08	0,03	-0,04	-0,49	-0,37
2067	-0,07	0,03	-0,04	-0,45	-0,34
AVERAGE	0,52	0,15	0,54	0,06	

7-2 Annual Cost as a Share of GDP under Alternative Tax Treatments

(20% tax rate during working, 5% tax rate during retirement, billion Yuan)

Year	EET	TEE	EEt	ETT	TTE
2010	0,99	0,02	0,99	0,83	-0,10
2011	1,03	0,05	1,03	0,71	-0,21
2012	1,08	0,07	1,08	0,60	-0,32
2013	1,12	0,09	1,12	0,48	-0,43
2014	1,16	0,11	1,16	0,35	-0,54
2015	1,17	0,13	1,17	0,20	-0,65
2016	1,18	0,15	1,18	0,05	-0,75
2017	1,18	0,16	1,18	-0,09	-0,86
2018	1,18	0,18	1,18	-0,24	-0,96
2019	1,17	0,19	1,18	-0,38	-1,05
2020	1,17	0,20	1,17	-0,51	-1,15
2021	1,15	0,21	1,16	-0,65	-1,23
2022	1,13	0,22	1,14	-0,77	-1,31
2023	1,11	0,23	1,12	-0,90	-1,39
2024	1,09	0,24	1,10	-1,02	-1,46
2025	1,06	0,25	1,08	-1,13	-1,53
2026	1,03	0,25	1,05	-1,23	-1,58
2027	1,00	0,25	1,02	-1,33	-1,63
2028	0,96	0,26	0,98	-1,42	-1,68
2029	0,93	0,26	0,95	-1,50	-1,72
2030	0,89	0,26	0,92	-1,58	-1,75
2031	0,85	0,26	0,88	-1,64	-1,78
2032	0,81	0,26	0,85	-1,69	-1,79
2033	0,78	0,25	0,81	-1,74	-1,81
2034	0,74	0,25	0,78	-1,78	-1,82
2035	0,70	0,25	0,74	-1,82	-1,82
2036	0,66	0,24	0,70	-1,84	-1,82
2037	0,62	0,24	0,67	-1,86	-1,81
2038	0,58	0,24	0,63	-1,87	-1,80
2039	0,55	0,23	0,60	-1,88	-1,79
2040	0,26	0,19	0,32	-2,09	-1,77
2041	0,22	0,18	0,27	-2,05	-1,72
2042	0,17	0,17	0,23	-2,01	-1,67
2043	0,13	0,16	0,20	-1,96	-1,61
2044	0,10	0,15	0,16	-1,91	-1,56
2045	0,06	0,14	0,13	-1,85	-1,50
2046	0,03	0,14	0,10	-1,78	-1,43
2047	0,00	0,13	0,07	-1,71	-1,37
2048	-0,03	0,12	0,05	-1,64	-1,30
2049	-0,05	0,11	0,03	-1,57	-1,24
2050	-0,07	0,11	0,01	-1,49	-1,17
2051	-0,08	0,10	-0,01	-1,41	-1,10
2052	-0,10	0,09	-0,02	-1,34	-1,04
2053	-0,10	0,09	-0,03	-1,26	-0,97
2054	-0,11	0,08	-0,04	-1,18	-0,91
2055	-0,12	0,07	-0,05	-1,11	-0,85
2056	-0,12	0,07	-0,05	-1,04	-0,79
2057	-0,12	0,06	-0,05	-0,97	-0,74
2058	-0,12	0,06	-0,06	-0,90	-0,69
2059	-0,11	0,05	-0,06	-0,84	-0,64
2060	-0,11	0,05	-0,06	-0,78	-0,59
2061	-0,11	0,05	-0,06	-0,72	-0,55
2062	-0,10	0,04	-0,05	-0,67	-0,51
2063	-0,10	0,04	-0,05	-0,62	-0,47
2064	-0,09	0,04	-0,05	-0,57	-0,43
2065	-0,09	0,03	-0,05	-0,53	-0,40
2066	-0,08	0,03	-0,04	-0,49	-0,37
2067	-0,07	0,03	-0,04	-0,45	-0,34
AVERAGE	0,52	0,15	0,54	0,06	

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